BACHELOR OF ECONOMICS
THAMMASAT UNIVERSITY

Course Outline

TU107 Digital Skill and Problem Solving

Semester:	Semester 2/2025 (January 5 – May 2, 2026)
Number of credits:	3 credits
Instructor:	Dr. Hugh Patrick O'Connell
E-mail:	hugh@planit.co.th
Office hours:	By appointment
Class Schedule:	Starting Date: 20 January 2024
	Monday 09.00 – 12.000
Class Room:	**305, 3nd floor, Faculty of Economics**
Online materials:	https://able-gateway.com/online
Prerequisites:	None

Course Description:

Basic computational thinking skill for solving problems and developing new social and economic opportunities. Efficient access and search for information. Information

reliability evaluation. Filtering and managing information systematically. Ethical digital usage and professional online communication.

Teaching Materials and Resources:

This course is designed to be contemporary and does not rely on a specific text book. Materials, exercises, case studies and quizzes will be provided by your instructor but you will also be required to do your own research and use various online and offline resources.

Recommended readings:

- Supplemental readings and videos will be posted in the online classroom for you.

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Week	Date	Topic	Details & Key Learning Focus
1	5 Jan 2026	Introduction to Digital Innovation	Exploring the integration of digital innovation with computational thinking to create social and economic opportunities.
2	12 Jan 2026	Information Access & Evaluation	Strategies for efficiently accessing, filtering, and evaluating the reliability and relevance of information.
3	19 Jan 2026	Applied Problem-Solving Frameworks	Applying systematic problem-solving skills and digital tools to address and resolve real-world issues.
4	26 Jan 2026	User Experience (UX) & User Interface (UI)	Principles and best practices for creating user-friendly interfaces and conducting usability tests.
5	2 Feb 2026	Ethical Application Development	Embedding professional practices and ethical considerations into the foundations of software development.
6	9 Feb 2026	Collaborative Digital Solutions	Engaging in teamwork and collaborative projects emphasizing ethical coding practices.
7	16 Feb 2026	Data Management & Visualization	Systematic data handling and utilizing visualization tools to extract insights and support decision-making.
8	23 Feb 2026	Mid-Term: Individual Assignment Due	No Examination. Submission of individual analytical reflection on AI ethics.
9	2 Mar 2026	Evaluating Digital Opportunities	Exploring and assessing digital opportunities and their social and economic impacts on different sectors.
10	9 Mar 2026	Data Protection & Ethics	Introducing an ethical framework for handling sensitive information and reinforcing data protection importance.
11	16 Mar 2026	Cybersecurity & Ethical Considerations	Digital security principles with an emphasis on responsible practices and safeguarding data.
12	23 Mar 2026	AI & Machine Learning (ML)	Fundamentals of AI/ML; implementing AI-powered solutions for process automation and predictive decision-making.

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13	30 Mar 2026	Ethical Implications of AI & ML	Discussion on responsible use, predictive algorithms, and the impact of these technologies on stakeholders.
14	6 Apr 2026*	Augmented Reality (AR) in Practice	Leveraging AR to enhance user experiences, product visualization, and marketing campaigns.
15	13 Apr 2026*	Creativity, Innovation & Trends	Harnessing design thinking and emerging trends (IoT, Blockchain) for ethical problem-solving.
16	20 Apr 2026	Digital Transformation Strategy	Group Project Due. Proposing innovative solutions and strategies for traditional industries.
TBA	TBA	Final Examination	Comprehensive assessment of course concepts.

Expected Learning Outcomes

1. Morality and Ethics

Applicability	Expected Learning Outcomes	Evaluation Method
N/A	1. Possess honesty, sacrifice, self-social, and environmental responsibility.	
N/A	2. Value “sufficiency” theory and adapt it in life path by adhering to adequacy, rationale, and immunity development.	

●	3. Value disciplines, respect, and comply with the rules and regulations of the institution and society at large.	Students' understanding and application of ethical principles will be assessed through a combination of exams and quizzes featuring ethical scenarios, assignments and projects that explore ethical issues within their field, case studies involving real-life ethical problems, and participation in class discussions on moral topics. These methods will evaluate their ability to analyze, propose solutions, and articulate ethical viewpoints.
N/A	4. Acquire knowledge related to digital ethics and professional online communication.	

2. Knowledge

Applicability	Expected Learning Outcomes	Evaluation Method
N/A	1. Acquire knowledge on and understand the important concepts core concepts of computational thinking and digital	
N/A	2. Acquire knowledge on and understand the important social and science concepts related to business management.	

●	3. Acquire knowledge on and understand the important concepts related to information management systems, UX/UI design principles, and data protection frameworks to suit the circumstances.	Students' comprehension of key business concepts will be assessed through exams and quizzes covering essential topics, assignments and projects that require in-depth analysis and application of these concepts, case studies to evaluate their problem-solving skills in practical scenarios, and presentations and group work to gauge their understanding and collaborative abilities.
N/A	4. Acquire the knowledge on academic advancement and professional development in advancements in emerging technologies like AI, ML, and AR the understanding of the situational adaptability and its impacts on business.	

3. Intellectual Development

Applicability	Expected Learning Outcomes	Evaluation Method
N/A	1. Be able to search and process information and utilize various concepts appropriately in a given circumstance in order to obtain relevant information to benefit in the evolving digital landscape.	

●	2. Be able to think systematically, rationally and creatively and to integrate knowledge from other disciplines to solve the problems in business and other settings.	Students' ability to think systematically, rationally, and creatively will be assessed through problem-solving assignments that require the integration of interdisciplinary knowledge, creative projects and innovation challenges, interdisciplinary case studies, research papers and essays demanding critical thinking and synthesis, and participation in class discussions and debates on complex topics.
N/A	3. Be able to collectively propose solutions to problems at hand and analyze the impacts of the proposed solutions and be able to choose the solution that is appropriate to a given situation to ensure business competitive advantages.	

4. Interpersonal Skills and Responsibilities

Applicability	Expected Learning Outcomes	Evaluation Method
N/A	1. Be able to work in team, possess interpersonal skills and leadership skills, and be professionally adaptive to a given situation.	
●	2. Be creative and constructively criticize to solve problem of the team.	Students' ability to engage in creative problem-solving and provide constructive criticism within a team will be assessed

		through group projects and collaborative assignments, peer evaluations focusing on their contributions and feedback skills, and team-based simulations and role-playing activities that mimic real-world scenarios.
N/A	3. Be responsible in lifelong learning to develop self and professional career.	

5. Quantitative Analysis, Communication and Information Technology

Applicability	Expected Learning Outcomes	Evaluation Method
N/A	1. Be able to apply mathematics, statistics, quantitative analysis in analyzing and making decisions in business and daily life.	
N/A	2. Be able to efficiently communicate in professional digital communication and engagement strategies.	
●	3. Be able to explain the issues and make the issues clear in verbal or writing, and be able to choose the appropriate pattern of communication for different groups of audience both in business context and in other contexts.	Students' ability to communicate issues effectively will be assessed through written reports and essays that evaluate clarity and appropriateness for different audiences, verbal presentations to gauge their articulation skills, case studies requiring written and verbal analysis, group discussions and

		debates to assess verbal communication abilities, and projects utilizing information technology tools to enhance communication and clarity.
●	4. Be able to utilize the information technologies or others to support the business operations.	

Learning Management and Evaluation:

Upon completion of this course, students will be able to:

- CLO 1: Apply computational thinking skills and systematic frameworks to define and solve real-world digital problems.
- CLO 2: Utilize predictive AI, machine learning concepts, and digital tools to develop logic for automated solutions.
- CLO 3: Critically evaluate the ethical implications, data protection requirements, and social impacts of emerging digital technologies.

CLO	Learning Management	Evaluation
CLO 1	Lectures on Information Evaluation and Applied Problem-Solving Frameworks.	Individual Analytical Reflection on AI Ethics.
CLO 2	"Autonomous Trading Bot Challenge" labs using No-Code or Python pathways.	Midterm Presentation and Final Group Project Report.

CLO 3	Discussions on AI/ML ethics, data protection frameworks, and cybersecurity	Final Examination and Group Project Ethics section.

Learning Assessment Plan

CLO	Methods of Learning Assessment	Assessment Week	Proportion of Assessment
CLO 1, 3	Individual Assignment (AI Ethics Reflection)	Week 8	25%
CLO 2	Midterm Bot Strategy Presentation	Week 8	0%
CLO 2, 3	inal Group Report (Trading Bot Project)	Week 16	25%
CLO 1, 2	Final Examination	TBA	50%

Policy on attendance and class participation:

Attendance, attitude, and preparation are important. Positive contributions to the class can provide rich reciprocal learning experiences. The right attitude means: a desire and willingness to study and learn, preparation as directed, and putting forth effort even when it may be inconvenient or difficult. It also means: being ready to answer questions when called upon, volunteering answer to questions or asking questions and actively listening to the instructor and other class members.

Grading:

Assignment – Individual	25%
Assignment - Group	25%
Final Examination	50%
	100%

Assignment – Individual

Due Date: Midterm Examination Day

"Ethical Considerations of AI in Education: An Analytical Reflection"

Assignment Objective

Your task is to critically analyse the ethical implications of Artificial Intelligence (AI) and Machine Learning (ML) applications in education. This assignment requires you to research, reflect, and present a balanced viewpoint on the potential and challenges of AI in educational settings, focusing on ethical considerations and predictive technologies.

Length and Format

- **Length:** Approximately 1,000 words (with a 10% margin allowed).
- **Formatting:** Neatly formatted, clearly structured, 12-point Times New Roman font, and double-spaced.
- **Submission:** Submit your assignment in PDF digital format via Able-Gateway.

Content Guidelines

1. Introduction (approx. 150 words)

- Briefly introduce the topic of AI in education.
- State the purpose of your reflection and specify which aspects of AI and ML applications you will focus on.

2. AI and Machine Learning Applications in Education (approx. 250 words)

- Describe various AI technologies currently used in educational contexts (e.g., adaptive learning systems, AI tutors).
- Discuss the use of **Predictive AI** and **Machine Learning** models used to forecast student performance, engagement levels, or learning outcomes.
- Briefly discuss their intended benefits and potential impacts on the learning environment.

3. Ethical Analysis (approx. 400 words)

- Critically examine the ethical implications of these AI applications.

- Consider specific issues such as data privacy, **algorithmic bias in predictive modeling**, the impact on teacher roles, and student equity.
- Reflect on different stakeholder perspectives, including students, educators, and administrators.

4. Case Study (approx. 100 words)

- Briefly analyse a specific case where AI or predictive analytics has been implemented in an educational setting.
- Highlight the ethical challenges and successes noted in this case.

5. Personal Reflection and Conclusion (approx. 100 words)

- Reflect on how AI in education—particularly automated or predictive systems—might affect your own learning or teaching experiences.
- Conclude by summarizing your stance on the ethical use of AI in education and provide recommendations for ethical guidelines or standards.

Evaluation Criteria

- **Research Depth:** Depth and relevance of research regarding AI and ML in education.
- **Analytical Clarity:** Effectiveness of the ethical analysis, particularly concerning bias and predictive accuracy.
- **Case Insight:** Insightfulness of the case study evaluation.
- **Personalization:** Depth and personalization of the reflection.
- **Writing Quality:** Overall quality of writing, proper citations, and adherence to formatting guidelines.

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Assignment – Group:

Due Date: Final Examination Day

Title: "Algorithmic Navigation: The Autonomous Trading Bot Challenge"

Weight: 25%

Objective

Your group is tasked with developing a comprehensive strategy and logic for an autonomous trading bot. This project aims to apply computational thinking, predictive AI, and systematic problem-solving to navigate a digital asset market (e.g., Stocks, Forex, Crypto, or Commodities). The focus is on the logical application of digital skills rather than financial gain.

Project Constraints

- **Capital:** Each group starts with **$10,000** in simulated (Demo/Paper) capital.
- **Demo Only:** Under no circumstances should real money be used. All trading must occur in a sandbox or demo environment.
- **Timeline:** The bot must be designed and "launched" by the Midterm. Trading will continue until the end of the semester.
- **Fair Play:** "Hail Mary" plays (all-in gambles toward the end of the semester) are strictly discouraged and will result in a lower grade for Risk Management.

Technical Suggestions for Implementation

Groups are free to choose their own technical path. Below are three suggested approaches depending on your group's technical comfort level:

- **The No-Code Pathway:** Use platforms like **Cryptohopper** or **3Commas**. These offer visual bot builders where you can set "If-Then" rules (e.g., "If price drops 5%, then Buy") using a drag-and-drop interface. They include excellent paper trading modes.
- **The Visual Scripting Pathway:** Use **TradingView (Pine Script)**. This allows you to write or adapt simple scripts that execute trades on a live-updating chart with your $10,000 demo funds. It is highly visual and has a massive community library of existing strategies.
- **The Developer Pathway:** For those comfortable with Python, use **Alpaca Markets** or **MetaTrader 5**. These platforms provide a "Paper Trading API" that allows you to run actual code against real-time market data without any financial risk.

Suggested Group Roles

To ensure all team members stay engaged, it is recommended to divide responsibilities like a real-world quantitative hedge fund:

- **Quantitative Strategist:** Defines the trading logic and "If-Then" triggers (e.g., analyzing market trends or news).
- **Technical Lead:** Manages the platform setup, ensures the script is running correctly, and handles API/interface connections.
- **Risk & Compliance Officer:** Responsible for the "Emergency Kill-Switch." They ensure the bot follows risk management rules and doesn't exceed 10% risk on any single trade.
- **Data Journalist:** Monitors the bot's daily progress and prepares the "Post-Mortem" stories for class updates and the final report.

Submission Timeline

1. **Midterm Presentation:** Groups must present their bot's logic, "if-then" triggers, and risk management plan for instructor sign-off.
2. **Trading Period:** From the Midterm until Week 15, groups will monitor their bots. Profits and losses will be shared periodically in class for discussion.
3. **Final Report:** A 3,000-word (approx.) comprehensive report due on the final examination day.

Final Report Content Guidelines

1. Market Analysis and Asset Selection (approx. 700 words)

- Provide a detailed analysis of the chosen asset class and the digital variables (news, data feeds, volume) that impact it.
- Describe the hypothetical "company" or entity managing this bot and the challenges of the digital market.

2. Bot Logic and Predictive Strategy (approx. 1200 words)

- Detail the "Autonomous Logic": What specific data points trigger a "Buy" or "Sell"?
- Detail the use of predictive AI or Machine Learning concepts to forecast market moves.
- Describe the implementation steps and the digital tools used to build the logic.

3. Ethical and Risk Considerations (approx. 600 words)

- Discuss the ethical implications of automated trading and its impact on society.
- Address "Human-in-the-Loop" requirements, such as an emergency kill-switch.
- Explain the risk management strategies used to protect the $10,000 demo capital.

4. Performance Reflection and Conclusion (approx. 500 words)

- Analyze the bot's performance. **Note:** If the bot went bust, your grade will be based on the depth of the "Post-Mortem" analysis and the understanding of *why* the logic failed.
- Conclude with a summary of the project's long-term learning benefits.

Evaluation Criteria

- **Logical Rigor:** Originality and systematic nature of the bot's logic and strategy.
- **Analytical Depth:** Ability to analyze market data and explain performance using course concepts.
- **Practicality and Ethics:** Realism of the risk management plan and the ethical soundness of the strategy.
- **Collaboration and Clarity:** Quality of the written report and effective communication of the bot's logic.

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Remark

ACADEMIC CALENDAR & HOLIDAY
SEMESTER 2/2025

Semester 2/2025 (January 5 - May 2, 2026)	
Enrollment by import quota (Confirm quota Via REG TU) (*ID 65 - 68)	December 1 – 4, 2025
Tuition Fee Payment Period (Via TU Greats App) (*ID 65 - 67)	December 1, 2025 – January 2, 2026
Classes Begin	January 5, 2026
Add-drop period (Via REG TU) (All *ID)	January 5 – 18, 2026 (from 9.00 AM of January 5 to 10.30 PM of January 18)
Tuition Fee Payment Period (Via TU Greats App) (For Students who add-drop courses) (All *ID)	January 5 – 19, 2026 (from 9.00 AM of January 5 to 10.30 PM of January 19)
Withdrawal period with "W" on record	January 19 – March 15, 2026 (from 9.00 AM of January 19 to 10.30 PM of March 15)
Mid-term Examination Period	February 22 – 28, 2026
Makha Bucha Day *	March 3, 2026
Special Withdrawal with "W" on record	March 16 – April 20, 2026
King Rama I Memorial and Chakri Day*	April 6, 2026
Songkran Festival Day*	April 13 – 16, 2026
Last day of class for Semester 2/2025	May 2, 2026
Royal Ploughing Ceremony*	May 11, 2026
Final exam period	May 5 – 19, 2026
Submitting Forms for Degree Conferral (ID.64-65)	January 5 – 18, 2026

Remark * Holiday, No classes during this period
Updated: October 22, 2025

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