



Course Outline

Annual International Training Course

1. Course Title:

AI for Science & Digital Innovation: Empowering International Economic & Social Transformation

2. Duration:

2 weeks during 8-25 June 2026

3. Background:

Thailand International Cooperation Agency (TICA)

TICA is a national focal point for Thailand's international development cooperation. It was established in 2004 to realize Thailand's aspiration to be a contributor to international development cooperation. Believing that global challenges are best addressed through international cooperation and global partnership, TICA continues to work closely together with its development partners to realize the global development agenda through various capacity-building and human resources development programmes. In response to the recent changes in the global landscape of development cooperation, TICA has strengthened its partnerships to harness the synergy of South-South and Triangular Cooperation to tackle global development challenges, including expediting the implementation of Sustainable Development Goals (SDGs). It also continues to realign our focuses in order to deliver Thailand's commitments as a global reliable partner.

Since 1991, TICA, in collaboration with educational institutions in Thailand, has offered short-term training courses under its Annual International Training Course (AITC) programme. The number of courses offered each year varies between 25 to 35 courses for 20-35 participants per course. AITC not only fosters good and friendly relations which Thailand has already enjoyed with recipient countries across regions, but also helps Thailand to reach out to those countries with which we desire to engage more closely. The courses offered by

TICA in 2023-2025 are categorized into 5 themes: Sufficiency Economy Philosophy (SEP), food security, climate change and environmental issues, public health, BCG Model related.

Organization/Institution

The course “AI for Science & Digital Innovation: Empowering International Economic & Social Transformation” is strategically developed to align with Mahidol University’s vision of fostering international collaboration and Thailand International Cooperation Agency’s (TICA) commitment to sustainable development. Mahidol University, through its Office of International Cooperation, actively promotes academic mobility, joint research, and capacity-building initiatives with global partners. This approach is in harmony with TICA’s mission to administer development cooperation programs that enhance human resource development and technical cooperation, particularly in neighboring countries and beyond.

By integrating artificial intelligence and digital innovation into this course, participants are equipped with the skills to address global challenges, thereby contributing to the realization of the United Nations Sustainable Development Goals (SDGs). This initiative underscores both Mahidol University’s and TICA’s dedication to fostering knowledge exchange, capacity building, and sustainable development on a global scale. Furthermore, the course supports Thailand’s role in South-South and triangular cooperation, facilitating knowledge-sharing and mutual learning among countries in the region. Through such initiatives, Mahidol University and TICA aim to enhance Thailand’s position as a hub for international development cooperation, leveraging expertise in science and technology to drive economic and social transformation globally.

4. Objectives:

The program is designed to:

- 1) Develop AI Literacy for Global Development.
- 2) Foster Ethical and Inclusive AI Practices.
- 3) Enhance Capacity for Digital Transformation.
- 4) Promote International Collaboration and Knowledge Exchange.

5. Course Contents:

Introduction to AI, data analytics and computational tools for international economic and social development; exploratory data analysis for discovering insights in complex datasets; linear regression for forecasting socio-economic trends; basics of artificial neural networks for automation; deep learning methods tackling global challenges; convolutional neural networks for image-based innovations; model evaluation ensuring accuracy and fairness; image processing techniques for environmental and urban monitoring; case studies showcasing AI's role in sustainable development; AI applications in chemical engineering for industry sustainability; aligning AI efforts with the UN Sustainable Development Goals; capstone project applying AI to empower global transformation

6. Participants' Criteria:

Applicants must fulfill the following requirements:

- Be nominated by their respective governments.
- Education: Bachelor's degree in engineering or science, or a related field
- Language: Proficiency in English including speaking, reading, and writing

7. Attendance and Evaluation

Participants who complete the training will receive a certificate based on:

- Real-time class attendance (not less than 80%)
- Interactive class participation
- Presentation and report
- Evaluation

8. Venue:

Faculty of Engineering, Mahidol University

9. Expected Results:

1) Enhanced Technical Competency

Participants will gain foundational and applied knowledge in AI, data analytics, and digital tools, enabling them to develop intelligent systems for solving complex scientific, economic, and social problems.

2) Practical Problem-Solving Skills

Learners will be able to design and implement AI-based solutions tailored to real-world challenges, particularly those aligned with sustainable development and inclusive innovation in diverse global contexts.

3) Cross-Cultural Collaboration and Networking

Participants from various countries will build international networks, fostering cross-cultural collaboration on digital innovation and science-driven development initiatives.

4) Leadership in Digital Transformation

Graduates will be prepared to take on leadership roles in advancing digital innovation strategies, contributing to policy, research, and practice that drive economic growth and social equity at local, regional, and international levels.

10. Organization/ Institution:

- **Implementing Agency;** Faculty of Engineering, Mahidol University
- **Contact Person**

Asst.Prof.Dr.Pornchai Bumroongsri Email: pornchai.bum@mahidol.ac.th

Asst.Prof.Dr.Poomiwat Phadungbut Email: poomiwat.pha@mahidol.ac.th

11. Expenditure/Funding:

Thailand International Cooperation Agency (TICA)

Government Complex, Building B (South Zone), 8th Floor,

Chaengwattana Rd. Laksi District, Bangkok 10210 THAILAND

Website: <https://tica-thaigov.mfa.go.th/en/index>

Email: aitc@mfa.go.th

Schedule for the Training Programme:

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Date/ Period /Topic	Time (Thailand time)	Content	Speaker	Note
Day 1 : 8 June 2026				
Introduction to AI, Data Analytics, and Computational Techniques for Global Impact				
Foundations of AI and digital innovation in international economic and social transformation	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Computational tools and data analytics techniques empowering scientific discovery and development	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Day 2 : 9 June 2026				
Exploratory Data Analysis (EDA) for Sustainable Development Insights				
Techniques for uncovering patterns and trends in complex data from global datasets	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	

Date/ Period /Topic	Time (Thailand time)	Content	Speaker	Note
Visualizing data to inform policy and innovation for social good	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Day 3 : 10 June 2026				
Advanced Exploratory Data Analysis & Ethical Data Practices				
Handling data quality, bias, and inclusivity in AI- driven decisions	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Case-driven exercises analyzing real- world development datasets	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Day 4 : 11 June 2026				
Linear Regression for Socio-Economic Forecasting and Policy Making				
Theory and assumptions behind regression models	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Applying regression models to predict economic and social transformation indicators	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Day 5 : 12 June 2026				
Basic Artificial Neural Networks (ANNs) – Empowering Automation and Innovation				

Date/ Period /Topic	Time (Thailand time)	Content	Speaker	Note
Understanding ANN architecture and learning algorithms	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Building simple neural networks for classification in development contexts	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Day 6 : 15 June 2026				
Deep Learning Methods to Address Complex Global Challenges				
Introduction to deep learning architectures and their role in digital innovation	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Case studies of deep learning applications in healthcare, agriculture, and environment	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Day 7 : 16 June 2026				
Convolutional Neural Networks (CNNs) for Image-Based Scientific Innovation				
CNN fundamentals and how they drive advancements in image analysis	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Applications in monitoring	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri	

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public health, environmental sustainability, and infrastructure		Presentation	Asst.Prof.Dr.Poomiwat Phadungbut	
Day 8 : 17 June 2026				
Practical CNN Implementation & Collaborative Project Ideation				
Hands-on CNN model building using real datasets relevant to international development	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Group brainstorming on AI projects targeting economic and social transformation	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Day 9 : 18 June 2026				
Prediction Testing and Model Evaluation for Reliable AI Solutions				
Prediction Testing and Model Evaluation for Reliable AI Solutions	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Techniques to mitigate overfitting and ensure	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	

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generalizability in diverse contexts				
Day 10 : 19 June 2026				
Image Processing Techniques Enhancing Environmental and Social Data Analysis				
Advanced image processing: filtering, segmentation, and feature extraction	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Applying image processing in disaster management and urban development monitoring	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Day 11 : 22 June 2026				
Case Studies: AI Applications Driving Economic and Social Transformation				
Detailed review of AI-enabled innovations impacting global communities	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Discussion on scalability, sustainability, and ethical considerations	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Day 12 : 23 June 2026				
AI-Driven Applications in Chemical Engineering for Sustainable Industry				

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Leveraging AI and data analytics for process optimization and green technologies	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Industry-focused examples demonstrating social and economic benefits	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Day 13 : 24 June 2026 Integrating AI Solutions for the UN Sustainable Development Goals (SDGs)				
Mapping AI innovations to specific SDGs	9.00-12.00	Lecture	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Workshop on designing AI projects with measurable development impact	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	
Day 14 : 25 June 2026				
Presentation of participant projects addressing international economic and social challenges	9.00-12.00	Lecture Presentation	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	

Date/ Period /Topic	Time (Thailand time)	Content	Speaker	Note
Feedback, course synthesis, and envisioning future leadership in AI-driven transformation	13.00-16.00	Lecture Workshop	Asst.Prof.Dr.Pornchai Bumroongsri Asst.Prof.Dr.Poomiwat Phadungbut	