TICA
Thailand International Cooperation Agency

Course Information

Topic: Upskilled Biomedical Engineers for Transformation of Healthcare Technology Supports

TICA : Thailand International Cooperation Agency is a department under the Ministry of Foreign Affairs of Thailand and a national focal point for international development cooperation with development partners and other developing countries around the world. TICA was established in 2004 to realize Thailand's aspiration to be a contributor of development cooperation. TICA's mission is to promote sustainable socio- economic development through sharing of knowledge and best practices. In response to the recent changes in the global landscape of development cooperation, especially through the concept of South- South and Triangular Cooperation, TICA continues to realign our focuses in order to deliver Thailand's commitment to be a relevant partner in global agendas including the 2030 Agenda for of Sustainable Development Goals (SDGs).	**Organisation/Institution** College of Biomedical Engineering, Rangsit University, Pathumthani, Thailand
Theme: Public Health **Main Goal:** To share knowledge on public health management such as primary health care, community health care, and universal health coverage, etc. **Areas of focus:** • Strengthening communities' capacity in public health management to foster community health such as promotion of community health systems, development of public health volunteers, establishment of community health funds, formulation of community health plans, community database development, etc. • Strengthening health systems in terms of policies, budgets and universal health coverage. • Enhancing primary health care such as maternal and child health management, pre-school health, children empowerment in the community, and prevention of social problems among children such as mental illnesses, unplanned pregnancy, etc.	**Course Objectives** The program is designed to: 1. Provide a unique opportunity for individuals who are responsible for medical equipment in a hospital to achieve a Certificate of Biomedical Engineering. 2. Enhance the knowledge and skills of biomedical engineers or biomedical engineering technician in a hospital in the field of smart medical devices and smart hospital engineering 3. Upskills biomedical engineers to support the transformation of healthcare technology

• Preparing for an aged society to reduce the overall socio-economic impacts caused by changes in the demographic structure, including the application of technology, innovation and automation to support the aged society. • Promoting occupational health by ensuring safe environment at workplaces, providing proper occupational tools for the safety of workers and preventing work-related diseases or symptoms such as respiratory diseases as a result of air pollution exposure, musculoskeletal disorders, office syndrome, etc.	
Course Contents: 1. Course Information This course composed of 6 topics in both lectures and hands-on practical workshops at College of Biomedical, Rangsit University. The participants will gain more experiences by visiting and on-site training at our networked hospitals and medical device companies/manufactures. The duration of the course is 120 hrs. or 1 month. The limited number of participants is 30 persons/ batch. 2. Course Description • Smart Medical Devices and Systems 15 h Architectures, services and protocols of smart systems; privacy and security; enabling technology of internet of things (IoT); IoT and smart system; smart cities; smart hospitals; smart medical devices; smart health and up-to-date application; smart data management network; medical blockchain; IoT related standardization; applications in the field of biomedical engineering; development of information systems for intelligent medical systems using programming language, such as, JAVA, PHP, Python etc. • Big Data Analytics in Medical Applications 15h Basic of big data analytics in healthcare concepts; big data management in healthcare; big data analytics models; big data analytics architecture; export and import data; big data analytics design;	**Attendance and Evaluation** • The participants must have minimum of 80% attendance • The evaluation based on the hands-on practical exams, case study analysis and assignments 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 • Hands-on practical exams **Venue:** • College of Biomedical Engineering, Rangsit University • The networked hospitals • Medical device companies and/ or manufactures **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

big data analytics security; implementation big data analytics systems; big data analytics evolutions use for healthcare system by using programming language, such as, R Python; overview of medical informatics; electronic health records; integrated practice management systems; health information technology; interoperability; patient informatics; online medical resources; mobile technology; disease management and disease registries; telehealth and telemedicine; data standard systems for e- health interoperability: HL7, DICOM and PACS. • Medical Artificial Intelligence 15h Artificial intelligence model for biomedical applications using Python; differences between conventional programming and artificial intelligence; study details in machine learning and deep learning including supervised learning and unsupervised learning; applications of artificial intelligence in of medical data for: classification, regression and clustering. • Smart Hospital Engineering and Management 30h Introduction to clinical engineering; basic principles of hospital engineering systems; standards and design principles for different places and systems in hospital including: patient wards, gas pipeline systems, vacuum system, electrical system, water well systems and wastewater systems, logistic system, security system; principles of smart hospital design; basic building system and facilities, outpatient and inpatient management system, smart systems for diagnosing and treating patients, patient safety care system, interconnected clinical information systems, networked of medical devices system, mobile device systems of clients, Identification system, intelligent management system; Prevention and risk management of smart hospital. • Computerized Maintenance Management System (CMMS) 30h Engineering maintenance concepts; importance and benefits of maintenance, life cycle of medical product and deterioration, life cycle costs, types	

of maintenance, information system for maintenance, reliability engineering, development of maintenance system, administration and management of biomedical engineering and biomedical equipment maintenance. Principles of metrology; standard systems of biomedical engineering, the principles testing and calibration of biomedical instrumentation. Specification and the maintenance processes of various medical equipment; preventive maintenance, testing, calibration and schedule- based maintenance, corrective maintenance, damage problem analysis, damage symptoms and repair methods and maintenance of medical equipment by standard manual. The objectives, benefits, and basic/ advanced features of a CMMS. The developing system specifications based on your individual needs and how to justify, evaluate, implement, audit and optimize CMMS to result in a positive return on investment. Assemble the information necessary to choose, install and use of CMMS. Evaluate the use of a CMMS for your facility. Explain the uses, data, and the importance of completeness and accuracy of your work orders. How to get the right information to the right person in a timely manner and how to set this up in the CMMS. The steps of implementing a CMMS. How to develop and evaluate a CMMS.	
Lecture Outline; 1st week **(3-8 June, 2024)** **1. Time (Thailand time) Monday, June 3 2024.- Wednesday, June 5 2024. at 9.00-11.00 (total 6 Hrs.)** **Content:** **Lecture Topic:** Paradigm Shift in Healthcare Smart Medical Devices and Systems **Speaker:** Assoc. Prof. Nuntachai Thongpance **2. Time (Thailand time): Monday, June 3 2024- Wednesday, June 5 2024. at 13.00- 16.00 (total 9 Hrs.)** **Content:** **Practice/ Laboratory Demonstration:**	

Smart Medical Devices and Systems **Speaker:** Lecturer Team from College of Biomedical Engineering, RSU and networking medical device companies/ manufactures **3. Time (Thailand time) : Thursday, June 6 2024.- Saturday, June 8 2024. at 9.00-11.00 (total 6 Hrs.)** **Content:** **Lecture Topic:** Principle of Big Data Analytics in Medical Applications **Speaker:** Mr. Anuchit Nirapai **4. Time (Thailand time) : Thursday, June 6 2024.- Saturday, June 8 2024. at 13.00-16.00 (total 9 Hrs.)** **Content:** **Practice/ Laboratory Demonstration:** Principle of Big Data Analytics in Medical Applications **Speaker:** Lecturer Team from College of Biomedical Engineering, RSU.	
Lecture Outline; 2nd week (10- 15 June, 2024) **5. Time (Thailand time) : Monday, June 10 2024.- Wednesday, June 12 2024. at 9.00-11.00 (total 6 Hrs.)** **Content:** **Lecture Topic:** Principle of Medical Artificial Intelligence **Speaker:** Assoc. Prof. Dr. Suejit Petchprasarn **6. Time (Thailand time) : Monday, June 10 2024.- Wednesday, June 12 2024. at 13.00-16.00 (total 9 Hrs.)** **Content:** **Lecture Topic:** Artificial Intelligence in Medical Applications and case studies discussion **Speaker:** Lecturer Team from College of Biomedical Engineering, RSU	

7. Time (Thailand time): Thursday, June 13 2024.- Saturday, June 15 2024. at 9.00-11.00 (total 6 Hrs.) Content: Lecture Topic: Smart Hospital Engineering Speaker: Asst. Prof. Thawat Kaewgun 8. Time (Thailand time): Thursday, June 13 2024.- Saturday, June 15 2024. at 13.00-16.00 (total 9 Hrs.) Content: Lecture Topic: Smart Hospital Engineering case studies discussion Speaker: Mr. Anantasak Wongkamhang	
Lecture Outline; 3rd week (17 June- 22 June, 2024) 9. Time (Thailand time): Monday, June 17 2024.- Wednesday, June 19 2024. at 9.00-11.00 (total 6 Hrs.) Content: Lecture Topic: Smart Hospital Management Speaker: Asst. Prof. Dr. Sani Boonyagul 10. Time (Thailand time): Monday, June 17 2024.- Wednesday, June 19 2024. at 13.00-16.00 (total 9 Hrs.) Content: Lecture Topic: Smart Hospital Management case studies discussion Speaker: Mr. Anantasak Wongkamhang 11. Time (Thailand time): Thursday, June 20 2024.- Saturday, June 22 2024. at 9.00-11.00 (total 6 Hrs.) Content: Lecture Topic: Maintenance Engineering of Biomedical Devices Speaker: Mr. Kittipan Rungprasert	

12. Time (Thailand time): Thursday, June 20 2024.- Saturday, June 22 2024. at 13.00-16.00 (total 9 Hrs.) **Content:** **Practice/ Laboratory Demonstration:** Maintenance Engineering of Biomedical Devices **Speaker:** Lecturer Team from College of Biomedical Engineering, RSU	
Lecture Outline; 4th week (24 June - 29 June, 2024) 13. Time (Thailand time): Monday, June 24 2024.- Wednesday, June 26 2024. at 9.00-11.00 (total 6 Hrs.) **Content:** **Lecture Topic:** Computerized Maintenance Management System (CMMS) **Speaker:** Mr. Anuchit Nirapai 14. Time (Thailand time): Monday, June 24 2024.- Wednesday, June 26 2024. at 13.00-16.00 (total 9 Hrs.) **Content:** **Practice/ Laboratory Demonstration:** Computerized Maintenance Management System (CMMS) **Speaker:** Lecturer Team from College of Biomedical Engineering, RSU.	