The 13th National Conference on Technical Education
The 8th International Conference on Technical Education

"Transitioning to The New Normal in Engineering and Education"

July 8–9, 2021
Faculty of Technical Education
King Mongkut's University of Technology North Bangkok

NCTechEd13 & ICTechEd8

July 8-9, 2021
KMUTNB Bangkok, Thailand

Organized by

Faculty of Technical Education

King Mongkut's University of Technology North Bangkok (KMUTNB), Thailand

The Association of Industrial Education (AIE)

Message from the President

According to the changing of the global economy, Thailand's economy highly depends on manufacture and service industries, the Sufficiency Economy Philosophy has been and continues to be a vital element of development strategy as they underpin the promotion of moderation, reasonableness, and resilience. To promote the development of science, technology, research, and innovation, these principles have significantly contributed to fostering change and smooth the transition to the "New Normal".

The 13th National Conference on Technical Education and the 8th International Conference on Technical Education" organized by The Faculty of Technical Education, KMUTNB held under the theme of "Transitioning to the New Normal in Engineering and Education". ICTechEd8 aims to provide an international forum for researchers, academicians as well as engineers to initiate, distribute, and exchange knowledge, new ideas, and application experiences about engineering and technical education to establish a sound foundation for the future industries and capture opportunities from global trends and technology.

On behalf of the University administration, faculty, and staff, I wish the event fruitful deliberations and productive outcomes. I hereby acknowledge and appreciate the efforts and cooperation of everyone -- faculty members, former and current students of the Faculty of Technical Education, for project collaborative arrangement and coordination. In the meantime, my sincere gratitude is particularly extended to all those who encourage dissemination of knowledge and effective strategy implementation. Undoubtedly, your meaningful endeavors will contribute to the positive development of national studies and research relevant to advanced Engineering and Technical education for years to come.

Professor Dr.-Ing. habil. Suchart Siengchin

President of King Mongkut's University of Technology North Bangkok

Message from Dean

The National Conference on Technical Education was initially organized in 2008 by the Faculty of Technical Education of King Mongkut's University of Technology North Bangkok (KMUTNB). Then in the year 2010, the International Conference on Technical Education was established for the first time. Since then, it became an annual event held each year, the 13th National Conference on Technical Education and the 8th International Conference on Technical Education will open on the 8th July 2021 at the Faculty of Technical Education, KMUTNB. The conference offers an opportunity for researchers, academicians, educators, and traders interested in the area of Vocational and Technical Education, to share their knowledge and experience under the theme of "Transitioning to the New Normal in Engineering and Education". I trust the conferences devoted to the advancement of innovation in the field of Engineering and Technical Education both nationally and internationally.

On behalf of the Dean of Faculty of Technical Education at KMUTNB, I would like to express my gratefulness to thank all our keynote speakers who made all the efforts to synthesize the materials and their wide and rich experiences to deliver distinguished talks. And thank all our committees, instructors, staffs, and students of the Faculty of Technical Education for your corporation and assistance in the 13th National Conference on Technical Education and the 8th International Conference on Technical Education to reach its objectives. Especially, thank you to King Mongkut's University of Technology North Bangkok, German-Thai Chamber of Commerce, and the Association of Industrial Technology Education. Finally, we hope that the participants enjoy the outstanding conference program of the 13th National Conference on Technical Education and the 8th International Conference on Technical Education in THAILAND.

Assoc. Prof. Dr. Pairote Stirayakorn
Dean, Faculty of Technical Education
King Mongkut's University of Technology North Bangkok

Message from the Conference General Chair

Dear Colleagues,

On behalf of the Organizing Committee, it is my great pleasure to welcome you to The 13th National Conference on Technical Education (NCTechED13) and The 8th International Conference on Technical Education (ICTechED8). Our annual conferences have become a key meeting ground for technical education and engineering, bringing together researchers, academicians, engineers, industry representatives, and students in the broad spectrum of engineering and education areas. This year's theme, "Transitioning to the New Normal in Engineering and Education", resonates well with global trends and technology in the wake of a new post-COVID era.

NCTechED13 and ICTechED8 are moving forward, connecting people to facilitate change. We are actively engaging with the industry to share best practices and come up with creative solutions throughout this evolving situation. Our conferences have been quick to support members during the pandemic by providing new and innovative programming that has allowed members to come together, to discuss, and to learn from each other and renowned experts.

We would like to take this opportunity to thank all the members of the organizing committee, all the authors, all the reviewers, all the co-organizers, all the sponsors, and all the local volunteers for their effort and valuable support to make NCTechED13 and ICTechED8 a reality. Special thanks go to the NCTechED13 and ICTechED8 staff for their outstanding service.

Once again, welcome to NCTechED13 and ICTechED8. I appreciate your participation and hope you will find this meeting stimulating and rewarding.

Suchya P.

Asst. Prof. Dr. Suchanya Posayanant
General Chair
The 13th National Conference on Technical Education
and the 8th International Conference on Technical Education
Faculty of Technical Education
King Mongkut's University of Technology North Bangkok

Message from the President of the AIE

The Association of Industrial Education (AIE) Thailand has a great honor to act as a host with the Faculty of Technical Education, KMUTNB in organizing the 13th National Conference on Technical Education and the 8th International Conference on Technical Education 2021.

The Association of Industrial Education (AIE) Thailand founded in the year 1999 which consist currently of 10 Higher Education Institutions in Thailand that offer technical education and industrial education curriculum. The first meeting of the International Conference on Technical Education conducted in 2010 under the cooperation of the AIE, KMITNB, KMITT, KMITL and RMUTT at that time.

The AIE aims to be a center for researchers, academicians, industries and others to establish and improve technical and industrial education competency and professional standards to support for needs of future Industries, publicize research about technical and industrial education field to national and international. It can be considered that the AIE is the main organization to help develop vocational education, technical and engineering education in the country. According to the changing of globalization such as the 4th Industrial Revolution, the impact of global warming, the quality of education 2030 (UNESCO: SDG 4), including the extreme pandemics of COVID-19 and Thailand in every circumstance has caused all extremely concern to realize the expediency for further improvement of the educational system in the days to come. The 13th National Conference on Technical Education and the 8th International Conference on Technical Education will be organized under the theme of "Transitioning to the New Normal in Engineering and Education". This is to initiate, distribute, and exchange their knowledge, research works and experiences.

As the president of the AIE, I fully hope that the conference will reach its objectives and I would like to express my thankfulness to all institutional members of the AIE, the organizing committee, all faculty staffs and sponsors for their strong support in organizing this conference.

Asst. Prof. Dr. Panarit Sethakul
President of the Association of Industrial Education
Advisor to the dean, Faculty of Technical Education,
King Mongkut's University of Technology North Bangkok

The Association of Industrial Education
Council Board

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Conference Program

The 13th National Conference on Technical Education (NCTechEd13)
The 8th International Conference on Technical Education (NCTechEd8)

Conference Theme:
"Transitioning to the New Normal in Engineering and Education"

Thursday, July 8, 2021

Online Presentation

Time	Details	Places:
08.00 – 09.00	Registration	Online presentation
09.00 – 09.30	NCTechEd13 and ICTechEd8 Opening ceremony by **KMUTNB Vice President for Research and Information Technology Development: Prof. Dr. Somrerk Chandra-ambhorn** NCTechEd13 and ICTechEd8 Opening speech by **Dean of FTE KMUTNB : Associate Professor Dr. Pairote Stirayakorn** NCTechEd13 and ICTechEd8 Opening speech by President of the Association of Industrial Education: **Asst. Prof. Dr. Panarit Sethakul**	Online presentation Live at https://www.facebook.com/ncteched
9.30 – 10.00 10.00 – 10.45	Awards & Sponsor Recognition Special presentation on the topic: **"Transitioning to the New Normal in Engineering and Education" By Mr. EKACHAI PHAKDURONG,** Head of Regulatory Affairs, Thaicom PLC.	Online presentation Live at https://www.facebook.com/ncteched Online presentation Live at https://www.facebook.com/ncteched
10.45 – 11.00	Coffee Break	
11.00 – 11.45	Special presentation on the topic: **"Online Learning Platforms in Higher Education Institutions" by Assoc.Prof.Dr.Thapanee Thammetar,** Director of Thailand Cyber University.	Online presentation Live at https://www.facebook.com/ncteched
12.00-13.00	Lunch	

Time	Details	Places:
13.00-14.15	NCTechEd13/ICTechEd8 Online Papers Presentation	Online Presentation with WebEx.com Meeting number: 142 612 7758
14.15-14.30	Coffee Break	
14.30–17.00	NCTechEd13/ICTechEd8 Online Papers Presentation	Online Presentation with WebEx.com Meeting number: 142 612 7758

Please note that the schedule is subject to change under certain circumstances.
*Update program on http://icteched.fte.kmutnb.ac.th and
http://ncteched.fte.kmutnb.ac.th

NCTechEd13 Session

1 ETE: (Engineering and Technical Education)

สาขาวิศวกรรมและเทคนิคศึกษา

ผู้ดำเนินรายการ รศ.ดร.สมศักดิ์ อรรคทิมากูล / ผศ.ดร.กิตติศักดิ์ แพบัว

13.00-13.15   ETE01   NC05   *สมศักดิ์ ธนพุทธิวิโรจน์*

การพัฒนาชุดฝึกอบรมการจัดการเรียนการสอนปฏิบัติการ โดยใช้รูปแบบ PESDEEP สำหรับ
ครูช่างอุตสาหกรรม สถาบันการอาชีวศึกษาภาคตะวันออกเฉียงเหนือ

13.15-13.30   ETE02   NC08   *กำลังใจ สงวนใจ*

การจัดการเรียนรู้โดยใช้สื่อเทคโนโลยีเสมือนจริงเสริม ของนักเรียนชั้น ปวช.1
วิทยาลัยเทคนิคสมุทรสาคร รายวิชาการติดตั้งไฟฟ้าในอาคาร

13.30-13.45   ETE03   NC12   *จิรโรจน์ สามารถโชติพันธุ์*

การสร้างเครื่องผสมปุ๋ยสำหรับครัวเรือน

13.45-14.00   ETE04   NC14   *รุ่งอรุณ พรเจริญ*

การพัฒนาชุดฝึกทักษะการชื่อมต่ออุปกรณ์ภายนอกบนไมโครคอนโทรลเลอร์
ผ่านโปรแกรมจำลอง

14.00-14.15   ETE05   NC20   *สุทธิพงษ์ ฟุ้งเคช*

สื่อเสริมแบบเสมือนจริง เรื่องการผลิตไฟฟ้าด้วยพลังงานแสงอาทิตย์

14.30-14.45   ETE06   NC27   *พิเชษฐ์ จันทวี*

ตัวแบบพยากรณ์ปริมาณการใช้พลังงานไฟฟ้าจากแสงอาทิตย์ที่เหมาะสมด้วยวิธีการปรับเรียบ
เอกซ์โพเนนเชียล กรณีศึกษา : มหาวิทยาลัยราชภัฏสงขลา

14.45-15.00   ETE07   NC30   *ศิวนาถ ราชชมภู*

การพัฒนานวัตกรรมการเรียนรู้ตามกระบวนการสอนเชิงปฏิบัติการ SLEDA
สำหรับการสอนทางด้านเทคโนโลยีระบบการสื่อสาร

15.00-15.15   ETE08   NC31   *ลัญฉกร นิลทรัตน์*

การศึกษาคุณลักษณะทางแม่เหล็กไฟฟ้าของเรโซเนเตอร์วงแหวนร่วมกับเทคนิคอินเตอร์ดิจิทัล
คาปาซิเตอร์ สำหรับการประยุกต์ใช้งานด้านการสื่อสารไร้สาย

15.15-15.30   ETE09   NC35   *สุปัญญา สิงห์กรณ์*

การพัฒนารูปแบบการเรียนการสอนเชิงนวัตกรรม DLAAP สำหรับการศึกษา
ด้านวิศวกรรมวงจรความถี่สูง

15.30-15.45   ETE10   NC45   *นุชนาฏ ชุ่มชื่น*

การพัฒนาชุดการเรียนรู้ผ่านกระบวนการสะเต็มศึกษาสำหรับการสอนปฏิบัติการ
วิศวกรรมอิเล็กทรอนิกส์กำลัง

2 ETE: (Engineering and Technical Education)

สาขาวิศวกรรมและเทคนิคศึกษา

ผู้ดำเนินรายการ ผศ.ดร.กิตติวุฒิ ศุทธิวิโรจน์ / ดร.ต้องชนะ ทองทิพย์

13.00-13.15   ETE11   NC07   *ปราชญ์ บุญเพ็ง*

การปรับปรุงคุณภาพดินเหนียวอ่อนด้วยจีโอโพลิเมอร์เพอร์ไลท์
กระตุ้นด้วยโซเดียมไฮดรอกไซด์

13.15-13.30   ETE12   NC10   *พานิช วุฒิพฤกษ์*

สมบัติทางวิศวกรรมของดินขาวและปูนสุกกระตุ้นแรงยึดเหนี่ยว
ด้วยสารละลายโซเดียมไฮดร็อกไซด์

13.30-13.45   ETE13   NC16   *พิชิต เพ็งสุวรรณ*

การพัฒนาชุดฝึกทักษะการตรวจสอบรอยร้าวด้วยคลื่นอัลตราโซนิค

13.45-14.00   ETE14   NC17   *คำแดง เฉยพินิจ*

การพัฒนาชุดการสอนออนไลน์ด้วยการเรียนรู้โดยการจำลองเป็นฐาน
เรื่อง ระบบนิวแมติกส์ไฟฟ้า

14.00-14.15   ETE15   NC28   *กีรติ วุฒิจารี*

การพัฒนาและสร้างโรงอบแห้งพลังงานแสงอาทิตย์สำหรับอบแห้งเมล็ดกาแฟ

14.30-14.45   ETE16   NC33   *เกริกชัย มีหนู*

การศึกษาอิทธิพลของตัวแปรที่มีผลกระทบต่อความหยาบผิวในกระบวนการกลึงปอกเหล็กกล้า
เครื่องมือความเร็วสูง M2

14.45-15.00   ETE17   NC34   *วิษณุ เกิดยอด*

การศึกษาปัจจัยที่ส่งผลต่อความเรียบผิวในการกลึงเหล็กกล้าผสมต่ำ เกรด SUJ2

15.00-15.15	ETE18	NC38	*พัชรี เพิ่มพูน*

การประยุกต์ใช้ AHP ในการตัดสินใจเลือกสารตั้งต้นเพื่อเตรียมเส้นใยจากนุ่น

15.15-15.30	ETE19	NC40	*ประเทือง ฝั้นแก้ว*

การพัฒนาและสร้างห้องอบอุณหภูมิต่ำความชื้นสัมพัทธ์ต่ำสำหรับอบแห้งเมล็ดกาแฟ

15.30-15.45	ETE20	NC42	*บริหาร บุตรแสนลี*

การพัฒนาระบบชดเชยแรงเนื่องด้วยน้ำหนักในระบบไฮดรอลิกแฮปติก

15.45-16.00	ETE21	NC56	*สุรชาติ จันทรชิต*

ระบบควบคุมความชื้นและเพาะปลูกต้นไม้อัตโนมัติ

3 ICT: (Information and Computer Technology)

สาขาเทคโนโลยีสารสนเทศ และคอมพิวเตอร์

ผู้ดำเนินรายการ ผศ.ดร.กฤช สินธนะกุล / ผศ.ดร.ดวงกมล โพธิ์นาค

13.00-13.15	ICT01	NC06	*ปิยะ ประสงค์จันทร์*

การสร้างและหาคุณภาพชุดการสอน วิชาเครื่องรับวิทยุตามหลักสูตรประกาศนียบัตรวิชาชีพ

13.15-13.30	ICT02	NC13	*ชนิดา นาชัย*

ผลการใช้นวัตกรรมเกมกระดานที่ส่งเสริมการคิดแก้ปัญหาในรายวิชาวิทยาการคำนวณ เรื่องการแก้ปัญหาอย่างเป็นขั้นตอนสำหรับนักเรียนชั้นประถมศึกษาตอนปลาย

13.30-13.45	ICT03	NC18	*วิลาณี อำนาจเจริญ*

ผลการจัดการเรียนรู้โดยใช้บทเรียนบนเครือข่ายแบบโครงงานเป็นฐานที่ส่งเสริมการคิดเชิงคำนวณในรายวิชา การเขียนโปรแกรมภาษาซี

13.45-14.00	ICT04	NC22	*สุรศักดิ์ บุญประเสริฐ*

ระบบข้อมูลภาวะการมีงานทำของผู้สำเร็จการศึกษาอาชีวศึกษา

14.00-14.15	ICT05	NC23	*รัชนี สิทธิศักดิ์*

การประยุกต์ใช้เครื่องมือทางปัญญาเพื่อส่งเสริมการเขียนโปรแกรมของนักศึกษาในช่วงสถานการณ์การเกิดโรคระบาด Covid-19

14.30-14.45	ICT06	NC25	*มะปอซี หะมะ*

การตรวจจับโรคใบข้าวด้วยโครงข่ายประสาทเทียมแบบคอนโวลูชั่นสำหรับระบบปฏิบัติการแอนดรอยด์

14.45-15.00   ICT07   NC26   *ภานุวัฒน์ ผาลาด*

การศึกษาสภาพปัญหา และความต้องการของการเรียนรู้โดยใช้หุ่นยนต์เป็นฐาน

15.00-15.15   ICT08   NC36   *ไชยยะ ธนพัฒน์ศิริ*

การพัฒนาห้องเรียนปฏิบัติการเสมือนจริง เรื่องวงจรเรียงกระแสในรายวิชาวงจรอิเล็กทรอนิกส์ 1 สำหรับนักศึกษาชั้นปีที่ 2 หลักสูตรครุศาสตร์อุตสาหกรรมบัณฑิต (หลักสูตรปรับปรุง พ.ศ. 2558)

15.15-15.30   ICT09   NC37   *วิชาญ เพชรมณี*

การพัฒนาชุดการเรียนแบบออนไลน์ โดยใช้รูปแบบการยึดผู้เรียนเป็นศูนย์กลาง (CIPPA Model) บูรณาการกับรูปแบบการเรียนรู้แบบเชิงรุก (Active Learning) เรื่องตัวเหนี่ยวนำ วิชาการวิเคราะห์วงจรไฟฟ้า หลักสูตรครุศาสตร์อุตสาหกรรมบัณฑิต

4 ICT: (Information and Computer Technology)

สาขาเทคโนโลยีสารสนเทศ และคอมพิวเตอร์

ผู้ดำเนินรายการ ผศ.ดร.จิรพันธุ์ ศรีสมพันธุ์ / ดร.พุทธิดา สกุลวิริยกิจกุล

13.00-13.15   ICT10   NC39   *บุษราคัม ทองเพชร*

ระบบติวสอบสมรรถนะวิชาชีพครู สำหรับนักศึกษาครูช่างอุตสาหกรรม โดยใช้บทเรียน ออนไลน์แบบมัลติมีเดีย บนสมาร์ทโฟน

13.15-13.30   ICT11   NC43   *ปิยะ ประสงค์จันทร์*

การพัฒนาและหาประสิทธิภาพบทเรียนคอมพิวเตอร์ช่วยสอนมัลติมีเดียแบบเกมเพื่อส่งเสริม การจำโดยประยุกต์ใช้เทคโนโลยี QR-Code เรื่อง Resistive Load รายวิชาทักษะพื้นฐาน ทางด้านไฟฟ้าและอิเล็กทรอนิกส์ หลักสูตรครุศาสตร์อุตสาหกรรมบัณฑิต สาขาไฟฟ้า

13.30-13.45   ICT12   NC44   *วราภรณ์ มั่นทุ่ง*

การศึกษาความพึงพอใจของผู้เล่นเกม ที่สร้างขึ้นโดยใช้เทคนิคการออกแบบตัวละครผสมผสาน คนกับสัตว์ รูปแบบแพลตฟอร์มเคลื่อนที่ด้านข้าง

13.45-14.00   ICT13   NC46   *สมพงษ์ แก้วหวัง*

การพัฒนาบทเรียนคอมพิวเตอร์ช่วยสอนมัลติมีเดีย เรื่องมัลติมิเตอร์รายวิชาทักษะพื้นฐาน ทางด้านไฟฟ้าและอิเล็กทรอนิกส์

14.00-14.15   ICT14   NC47   *กรภัทร เฉลิมวงศ์*

การพัฒนาชุดการสอนออนไลน์ผ่านโปรแกรมกูเกิ้ลคลาสรูม เรื่องอินฟราเรด เซนเซอร์ รายวิชา ไมโครคอนโทรลเลอร์และอินเตอร์เน็ตของสรรพสิ่ง หลักสูตรครุศาสตร์อุตสาหกรรมบัณฑิต

| 14.30-14.45 | ICT15 | NC49 | *นรงฤทธิ์ เสนาจิตร* |

การพัฒนาและทดสอบประสิทธิภาพของชุดทดลองระบบไฟฟ้า รายวิชาการวิเคราะห์
วงจรไฟฟ้า หลักสูตรครุศาสตร์อุตสาหกรรมบัณฑิต

| 14.45-15.00 | ICT16 | NC50 | *กระวี อนนตรี* |

การพัฒนาบทเรียนออนไลน์ผ่านแอปพลิเคชันบนสมาร์ทโฟน เรื่องทรานซิสเตอร์ รายวิชา
ทักษะพื้นฐานทางด้านไฟฟ้าและอิเล็กทรอนิกส์ หลักสูตรครุศาสตร์อุตสาหกรรมบัณฑิต

| 15.00-15.15 | ICT17 | NC52 | *กฤษฎา คงพูน* |

การพัฒนาและหาประสิทธิภาพชุดการเรียนรู้แบบผสมผสาน เรื่อง ใบวัดมุม วิชา เครื่องมือวัด
และมาตรวิทยา หลักสูตรครุศาสตร์อุตสาหกรรมบัณฑิต

5 EMA: (Education Management and Administration)
สาขาการจัดการและการบริหารการศึกษา
ผู้ดำเนินรายการ ผศ.ดร.สยาม แกมขุนทด / ดร.อโนมา ศิริพานิช

| 13.00-13.15 | EMA01 | NC01 | *อันนา สถิตย์ถวิลวงศ์* |

การศึกษาอิทธิพลของแรงจูงใจในการทำงานที่มีผลต่อความผูกพันต่อองค์กรของพนักงานใน
อุตสาหกรรมจักรยานยนต์ในประเทศไทย กรณีศึกษาบริษัท ไทยฮอนด้า แมนูแฟคเจอริ่ง จำกัด

| 13.15-13.30 | EMA02 | NC02 | *อรกัญญา แสงไชย* |

การศึกษาปัจจัยการจัดการองค์กรที่มีอิทธิพลต่อแรงจูงใจในการทำงานของแรงงานไทยใน
อุตสาหกรรมการผลิตคอนกรีต

| 13.30-13.45 | EMA03 | NC03 | *นิตยา อุตกฤษฏ์* |

ผลสัมฤทธิ์ทางการเรียนหลักสูตรวิศวกรรมศาสตรบัณฑิต ของนักศึกษาที่สำเร็จจากโรงเรียน
เตรียมวิศวกรรมศาสตร์ ไทย-เยอรมัน มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าพระนครเหนือ

| 13.45-14.00 | EMA04 | NC04 | *ปราโมช ธรรมกรณ์* |

แนวทางการประกอบการธุรกิจบริการสุขภาพ กรณีศึกษา บริษัท มิตรไมตรีการแพทย์ จำกัด

| 14.00-14.15 | EMA05 | NC09 | *ขวัญชนก แพงตุ้ย* |

การศึกษาการบริหารงบประมาณเงินรายได้เพื่อเป็นแนวทางการพัฒนา มหาวิทยาลัยเทคโนโลยี
พระจอมเกล้าพระนครเหนือ

14.30-14.45   EMA06   NC15   *วิวรรธน์ วงค์จันทร์*

การศึกษาผลสัมฤทธิ์ทางการเรียนของนักศึกษาชั้นปีที่ ๒ สาขาวิชาเทคนิคการผลิต โดยใช้
แบบฝึกหัดในรายวิชาโปรแกรมเอ็นซีพื้นฐาน กรณีศึกษา บริษัท บีดีไอ กรุ๊ป จำกัด

14.45-15.00   EMA07   NC41   *สราวุฒิ สืบแย้ม*

ทักษะแห่งศตวรรษที่ 21 ของผู้สำเร็จการศึกษาระดับประกาศนียบัตรวิชาชีพชั้นสูง (ปวส.)
ประเภทวิชาอุตสาหกรรม สาขาวิชาเทคนิคเครื่องกล (สาขางานเทคนิคยานยนต์) ตามความ
ต้องการของสถานประกอบการในประเทศ

15.00-15.15   EMA08   NC48   *พลศักดิ์ เลิศหิรัญปัญญา*

แนวทางการจัดการเรียนการสอนภายใต้สถานการณ์การแพร่ระบาดของเชื้อไวรัสโควิด-19
มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าธนบุรี

15.15-15.30   EMA09   NC57   *อพิญญา มุ่งอ้อมกลาง*

กลยุทธ์การปรับตัวของผู้ประกอบการธุรกิจการพิมพ์ขนาดกลางในยุคดิจิทัล

15.30-15.45   EMA10   NC55   *ศักดา กตเวทวารักษ์*

การพัฒนาบทเรียน E-Learning การทดสอบวัสดุไม้และเหล็กตามมาตรฐานในงานก่อสร้าง

ICTechEd8 Session

Session A-1   Chairman : Prof. Dr.Panich Voottipruex
               Co-chairman : Asst. Prof. Dr.Suchanya Posayanant

13.00-13.15	IC08_16	*Suchanya Posayanant*

Contemporary Strategic Tools in Construction Companies Context

13.15-13.30	IC08_11	*A. Kijpayoong*

An Improved Multi-Reservoir Operation using Harmony Search Based Decision-Making Modeling with Gridline Operating Rule for Water Management in Chao Phraya River Basin

**Selected paper for International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies

13.30-13.45	IC08_05	*Ria Asih Aryani Soemitro*

Preliminary Curriculum Design for Indonesian Master of Engineering Program on Public Infrastructure Asset Management

13.45-14.00	IC08_09	*Krotsuwan Phosuwan*

Optimized Deep Learning Procedure by Adaptive Parameters based Genetic Algorithms for Determining Reservoir Inflow

**Selected paper for International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies

Session A-2   Chairman : Assoc. Prof. Dr.Pichet Sriyanyong
               Co-chairman : Asst. Prof. Dr.Soradech Krootjohn

14.30-14.45	IC08_06	*Korakit Vittinanon*

Optimization of PID controllers in a brushless DC motor system with IWOA

14.45-15.00	IC08_10	*Sakchan Luangmaneerote*

Clustering Student Performance Based on Family and Educational Backgrounds: A Case Study of the Faculty of Agriculture and Technology

Session B-1   Chairman : Prof. Dr.Prachyanun Nilsook
Co-chairman : Assoc. Prof. Dr.Panita Wannapiroon

13.00-13.15   IC08_02   *Krishda Srichanpiyom*

The Development of Motivation Skills for Students in Professional Experience I in Electrical Engineering,Faculty of Technical Education, King Mongkut's University of Technology North Bangkok

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13.15-13.30   IC08_03   *Kitti Surpare*

Impact Results of Using Electronic Evaluation Portfolio with Feedback Data for Students of Technical Teacher Training Program

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13.30-13.45   IC08_07   *Apichaya Khwankaew*

The Instructional Design Model to Develop an Educational Innovation and Information Technology for Industrial Education

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Session B-2   Chairman : Mr.Teeratorn Saneeyeng
Co-chairman : Assoc. Prof. Dr.Chaiwichit Chianchana

14.30-14.45   IC08_13   *K. Klinbumrung*

Online Social Network Based Blended Learning to Enhance Creative Thinking Skill for Electrical Engineering Education

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14.45-15.00   IC08_14   *Pongsaton Palee*

Development intelligent career prediction system for digital manpower

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15.00-15.15   IC08_15   *Napajit Dusadee*

Development of Virtual Professional Training Community System to develop Digital Teacher Competencies

Map

https://goo.gl/k6KVD1

5(52) *FTE Building*

Contents

NCTechEd13

13th National Conference on Technical Education

Engineering and Technical Education

วิศวกรรมและเทคนิคศึกษา

NCTechEd13 **ETE01-ETE21**

Development the Training Package of Instruction Laboratory Based Using PESDEEP for Industrial Teachers of Vocational Education Institute: Northeastern

Somsak Thanaputtiwirot, Parichat Kinaree, Ampawan Yindeemak, Jirarot Samartchotipan
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Rajamangala University of Technology Isan, Khonkaen Campus, Thailand

The objectives of this research were to develop the training package of instruction laboratory based using PESDEEP for industrial teachers of Vocational Education Institute: Northeastern, and to evaluate the satisfaction of industrial teachers trained by the training package to be developed. The procedures of this research started from study the development method of training package, PESDEEP Learning model, construction an assessment form, and creation the satisfaction questionnaire. The developed training package of instruction laboratory based using PESDEEP consists of content sheets are course analysis, job sheet, operation sheet, form of learning behaviors assessment for PESDEEP learning model, achievement test, training media, simulation program, and the satisfaction evaluation form. The developed training package brings to evaluate the suitability by 3 experts. After that, the training package takes to train with 65 industrial teachers are teaching in 13 colleges including technical colleges, polytechnic college, and vocational college under the Vocational Education Institute: Northeastern. The results of the research showed that the suitability evaluation of the developed training package is most suitable. ($\bar{x}$=4.55)The satisfaction of the industrial teachers were trained by training package is most satisfied. ($\bar{x}$=4.60)Therefore, the training package to be developed can be using to train industrial teachers which have knowledge, understand, and to develop themselves for creating knowledge obtained from training with more quality.

Online full paper: **https://bit.ly/36UPWRR**
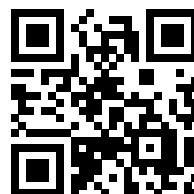
ETE02:NC08

Learning Management using Augmented Reality Technology of Students in Vocational Certificate 1, Samut Sakhon Technical College, course on Electrical Installation in Buildings

Kumlangjai Sa-nguanjai, Tanes Tanitteerapan
kumlangjai.2536@gmail.com

King Mongkut's University of Technology Thonburi, Thailand

The objectives of this research were to 1) manage learning by using virtual technology media to supplement the course on electrical installation in buildings by using virtual technology media to teach along with classroom learning management. 2) to find the learning achievement of the sample group 3) to find the students' satisfaction with the learning materials with virtual technology by using the experimental worksheet during, pre-test and post-test and questionnaire respectively as a tool to collect data from students of the Electrical department, vocational certificate level, 1st year, Samut Sakhon Technical College of 20 by a simple random sampling method from the students of the Electrical department, vocational certificate level 1st year, Samut Sakhon Technical College consisted of 112 people. The standard deviation mean difference and statistical values in the t-Distribution. The results showed that 1) The efficiency of learning management using augmented reality technology of the sample group assessed from the experimental worksheet during and post-test, to find the average score on the efficiency of learning management at 80.19/ 84.68 (E1 / E2). Which the efficiency was higher than the specified criteria 80/80 2) The learning achievement of the sample using virtual technology media had the mean learning achievement after school ($\bar{x}$ = 67.75, SD = 2.77) than before. ($\bar{x}$ = 62.3, SD = 2.27) with statistical significance at the .05 level, that is, virtual technology media affects learning achievement. Overall, it was at a good level of 4.38 points. In summarizing the research results, it can be concluded that learning management using augmented reality technology. They have a good learning management efficiency and learners have a good level of media satisfaction.

Online full paper: **https://bit.ly/3x4k2Nk**
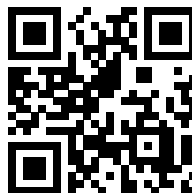
The Construction of Fertilizer Mixing Machine for Household

Jirarot Samartchotipan, Jankhati Trisuwan, Komol Khwanchen, Suparoek Sonsa
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This research aims to construct the chemical fertilizer mixing machine for household at a maximum weight of 50 kilograms. There are consisted of 4 main parts, 1.) Urea fertilizer tank Diammonium phosphate fertilizer tank and Potassium chloride tank 2.) Weighing scale 3.) Mixing tank and 4.) Control unit using microcontroller. The operating modes of the machine are semi-automatic and automatic. The performance results found that the semi-automatic mode has an absolute weight error is not exceed ±0.30 kilograms, while the automatic mode is not beyond ±0.32 kilograms. The absolute error of both modes is less than the chemical fertilizer mixing level from the Ministry of Agriculture and Cooperatives (±0.5 kilograms). Thus, the fertilizer mixing machine for household can be used to fertilizer mixing efficiently.

Online full paper: **https://bit.ly/36TlveT**
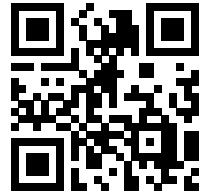
The Development of Skills Training Kit for Interconnection with External Device on Microcontroller via Simulator Program

Rungaroon Pornchraoen, Nikom Distaklu
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Rajamangala University of Technology Phra Nakhon, Thailand

This research presents the development of skills training kit for interconnection with external device on microcontroller via a simulator program. There were 5 experiments including 1) the output external device 2) the input signal of external 3) the input of signal analog 4) applied used the pulse signal modulation and 5) inertial measurement unit signal reading. This skills training kit consists of a microcontroller board that is used to interface with a computer and the software used to connect is the LabVIEW program that is used to write programs to the microcontroller board. It also shows the results of work via simulator program. The results showed that the skills training kit can theoretically connect to the computer and display via simulator program. It allows learners to understand the basic microcontroller external device communication. As well as the principles of programming simulators for controlling various devices can help learners to understand. It can be used as an effective instructional tool for teaching and learning.

Online full paper: **https://bit.ly/3ruhnLK**
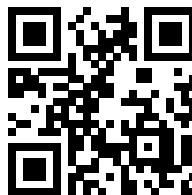
Augmented Reality Electricity Generation by Using Solar Energy

Suttipong Fungdet, Yanika Kethaisong, Pattarawan Saithongyon
suttipong.fu@rmuti.ac.th

Rajamangala University of Technology Isan, Khonkaen Campus, Thailand

This paper presents the creation and measuring quality of the augmented reality (AR) media that is used to demonstrate the electricity generation by using solar energy. The research objectives are the creation, the measuring quality and satisfaction survey form the users. The created AR media consists of the video and the three dimensions (3D) of the virtual pictures. The proposed AR media is demonstrated to install the solar panels, the charging controllers, the electrical transmission lines, the inverters, the batteries, the direct current (DC) loads, the alternative current (AC) loads, the transmission line of the solar cells, the circuit breakers, the devices of surge protection and testing form. The AR media is designed and created by the V-director program and the V-player. The quality of the AR media is evaluated by expert committee. The result of the quality evaluation is Excellence. The satisfaction evaluation is Excellence. The Excellence can be achieved following the assumption.

Online full paper: **https://bit.ly/3BB20pg**

Optimal Forecasting Model of Solar Electricity Consumption with Exponential Smoothing Method, A Case Study: Songkhla Rajabhat University

Pichet Chantawee
pichet.ch@skru.ac.th

Songkhla Rajabhat University, Thailand

The Solar power generation was an important renewable energy source. It was contributing to energy and environmental conservation of Songkhla Rajabhat University. In order to make an efficient energy management plan. Therefore, a optimal model for forecasting solar electricity consumption was using solar electric power data. These were times series from March 2019 - April 2021. These were finding a model for electricity consumption forecasting in advance until the end of 2021 by using a statistical package software with exponential smoothing methods both seasonal and non-seasonal influences for a total of 7 models. It was found that the most optimal model by the exponential smoothing method with simple seasonal by Mean Absolute Percentage Error (MAPE) was equal to 14.39, Winter's additive was equal to 15.36 and Simple non-seasonal was equal to 15.50, respectively.

Online full paper: **https://bit.ly/3iDu6rl**
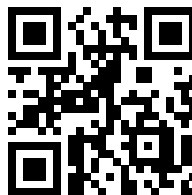
Development of Learning Innovation Supporting to SLEDA Practice Based Teaching Process in Teaching of Communication System Technology

Siwanat Rachchompoo, Kobkhun Chaiyawong, Nutchanat Chumchuen, Somsak Akatimagool
siwanatchamp@gmail.com

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The research paper aims to develop the learning innovation using the SLEDA practice based teaching process in teaching of communication system technology. The research procedure had been started from surveying the problems of engineering education. Studying and developing of the learning innovation package consists of 1) design of the SLEDA practice based teaching process containing of 5 steps; Searching, Learning Exchanging, Doing, and Assessment step,2) construction of the communication engineering simulator, and 3) development of the experimentation package of AM and FM radio transceiver and receiver. The performance of developed learning innovation package was evaluated by 5 experts and 30 sample group of students in bachelor of science in teacher training in electrical engineering, Faculty of industry and technology at Rajamangala university of technology Isan, Sakonnakhon campus. The research results shown that 1) the developed learning innovation package was at the highest appropriate level, 2) the evaluation of learners' satisfaction in using the SLEDA based learning innovation package was at the highest level which was consistent with research hypothesis. The developed learning innovation package is able to apply in the quality teaching and learning of communication systems or other related courses in technology.

Online full paper: **https://bit.ly/3iE1Sgi**

Study of Electromagnetic Characteristics of Split Ring Resonator Using Interdigital Capacitor Technique for Wireless Communication Applications

Lanchakorn Nintarat, Pongsathorn Chomtong, Somsak Akatimagool
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King Mongkut's University of Technology North Bangkok, Thailand

This research presents the Study of Electromagnetic Characteristics of Split Ring Resonator Using Interdigital Capacitor Technique for Wireless communication applications. The objective is to study the response of various parameters and design Metamaterials for use in wireless communication. The study found that Metamaterials designed can control the resonance frequency as needed. Designed for operating frequencies at 1.8 GHz, it covers the 1.69 GHz - 1.83 GHz bandwidth and the 2.4 GHz frequency cover the 2.21 GHz - 2.44 GHz bandwidth, respectively. Moreover, can reduce the size of unit cell from to and can be applied to antennas, and a reflector as well.

Online full paper: **https://bit.ly/3Bsa5wJ**
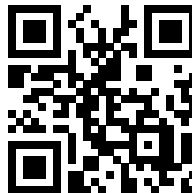
Development of DLAAP Innovation-based Learning and Teaching Model for High-Frequency Circuit Engineering Education

Supanya Singkorn, Kanyawit Klinbumrung, Somsak Akatimagool
supanya.s@rmutp.ac.th

King Mongkut's University of Technology North Bangkok, Thailand

The objectives of this research are 1) to study and survey the state of problems and guidelines for teaching and learning in electronic and telecommunication engineering. and 2) to develop an innovation-based learning model which focuses on the integration of several theories comprising innovative learning, analytical thinking, problem solving and innovative thinking for teaching and learning in high-frequency circuit engineering. The developed learning model, known as DLAAP Innovation-based learning, consists of five steps: Determination, Learning, Analysis, Action, and Progress. was at highest level ($\bar{x}$=4.66). It can be seen that most of the teaching and learning conditions were traditional learning models. Therefore, it should focus on students to practice more, to develop a variety of teaching materials and organize learning activities for students to participate more in the classroom;It can encourage learners to have both knowledge, practical and innovative skills. The research goal is to produce graduates who meet professional standards in technology and engineering, they can develop and create innovations including processes, methods, and technologies both in the education and industry sector. The learning and teaching management can support and respond to the economic and industrial development policy in the era of Thailand 4.0.

Online full paper: **https://bit.ly/3rrjmAw**
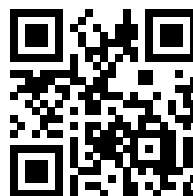
Development of STEM Education based Learning Package for Teaching of Power Electronic Engineering Laboratory

Nutchanat Chumchuen, Nitchamon Poonnoy, Pisuit Janchaichanakun
nutchanat.c@fte.kmutnb.ac.th

King Mongkut's University of Technology North Bangkok, Thailand

The research objective in this paper describes the development of learning package through the STEM education for teaching of power electronic engineering laboratory. The research tool consists of experimental kit of boost converter circuit, a Graphical User Interface based simulator (MATLAB-Simulink) for analyzing the on-off switch states of current and voltage of the DC-DC boost converter circuit, test for evaluating learning achievement and satisfaction assessment form. The sampling group consisted of 21 students enrolling in the in the power electronic engineering laboratory course of electrical engineering program in semester 1/2019 at King Mongkut's University of Technology North Bangkok. The quality evaluation of the developed research tool from five experts indicates an appropriation in average of 4.10. The STEM based teaching activities by using the developed learning package was effective at calculating value equal to 1.06 in accordance with the standard criteria using Meguigans's theory. Moreover, learning achievement between the pre-test and post-test test was a statistically significant at .05 level. The satisfaction of the learners is at a high level that has a mean value of 4.22. In conclusion, it can been seen that the development of quality learning package through the STEM education can be used effectively in teaching and learning of power electronics engineering. The appropriated teaching model can encourage learners to acquire essential learning skills that are consistent with the 21st century to preparing to work in the industry to their full potential.

Online full paper: **https://bit.ly/3hYONPk**
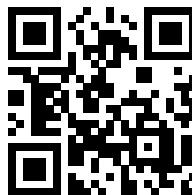
Soft Clay Improvement using Perlite Geopolymer Activated by Sodium Hydroxide

Prat Boonpeng, Panich Voottipruex, Ittipon Meepon, Sayam Kamkhuntod, Sirisak Kongsomsaksakul
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This research investigates the improvement of soft clay using perlite geopolymer, catalyzed reaction with sodium hydroxide by experimenting to find the appropriate ratio, curing time and curing temperature to increase the properties in terms of compressive strength and tensile strength of geopolymer clay. Initially, the geopolymer was prepared by mixing perlite with 6 molar sodium hydroxide solution at a ratio of 1.0:0.95 wt. perlite to sodium hydroxide solution. The clay was modified by replacing it with geopolymer perlite in ratios of 10, 20, 30, 40 and 50 by dry weight of soil. The samples were incubated at 25 and 70 degrees Celsius for 7, 14 and 28 days and then tested for unconfined compressive strength and tensile strength test. It was found that the ratio of clay to geopolymer perlite 90:10, curing time 28 days, curing temperature 25 degrees Celsius, compressive strength was 1119 kPa, which was higher than the Department of Highways standard that required strength. The unconfined compressive strength at 28 days was equal to 1,000 kPa (500 kPa undrained shear strength),indicates that it can be used as a substitute for cement in soil cement column applications.

Online full paper: **https://bit.ly/36XEZPi**
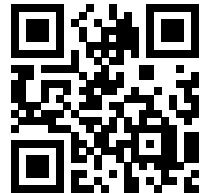
ETE12:NC10

Engineering Properties of Kaolin and Quick Lime Stimulating Bonding Using Sodium Hydroxide Solution

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This research studied engineering properties of kaolin and quick lime, stimulating the bonding using sodium hydroxide solution, incubating at 70 . The samples with the ratio of kaolin: quick lime equal 80:20 at curing period of 120 days exhibit the highest unconfined compressive strength. On the other hand, the samples with the ratio of kaolin: lime equal 20:80, at curing period of 120 days exhibit the highest split tensile strength. From wet and dry durability test, samples with the kaolin: cement ratio of 80:20 showed highest unconfined compressive strength with less corrosion resistance. The value was higher than the standard for road work materials in accordance with the standards of the Department of Highways and the Department of Public Works and Town & Country Planning, which indicated that unconfined compressive strength at 7 days aging for soil cement base was 1,724.00 kPa, and soil cement subbase was 689 kPa.

Online full paper: **https://bit.ly/2TACnUI**
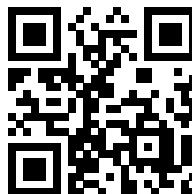
The Development of The Instructional Package for Crack Inspection by Ultrasonic Test

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The objectives of research were: 1) to create and evaluate the instructional package 2) to determine the effectiveness of the instructional package 3) to evaluate user satisfaction to the instructional package for Crack Inspection by Ultrasonic Test. The research tools used in this study were: 1) the quality evaluation forms 2) The Instructional Package for Crack Inspection by Ultrasonic Test. The sample groups were selected from a specific selection of 23 undergraduate students enrolled in first semester of academic year 2020, program in Industrial Education, Faculty of Industrial Education and Technology, Rajamangala University of Technology Srivijaya. The result indicated that 1) the quality of instructional package was good level ($\bar{x}$= 4.36 S.D.=0.52) 2) the instructional package has an efficiency of 83.09/84.61 which is higher than the specified threshold of 80/80 3) the users' satisfaction with learners using this instructional package was good level ($\bar{x}$= 4.41, S.D.=0.49). Therefore, this instructional package for crack inspection by ultrasonic test can be effectively applied in the teaching of material inspection and testing.

Online full paper: **https://bit.ly/2W7mqGd**
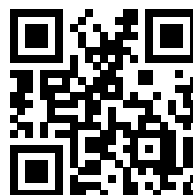
A Development of Online Instructional Package by Simulation-based Learning on Electro-pneumatic System

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This research was a quasi-experimental research to purposed 1) to develop an online instructional package by simulation- based learning on electro-pneumatic system 2) to compare the achievement pre – test and post - test with online instructional package by simulation- based learning on electro-pneumatic system 3) to study students' satisfaction on online instructional package by simulation- based learning on electro-pneumatic system. Research methodology, which consists of teaching materials test before study achievement test that is evaluated by experts and try out with a group of students who were senior vocational teachers Vocational Teacher Course Vocational Education Development Institute, Lao PDR (Course 2017), Department of Mechanical Engineering Teachers Vocational Education Development Institute, Lao PDR. Specifically, enrol in pneumatics - hydraulics. by using the selection type (purposive sampling) The research results shown that the teaching sets developed after expert assessment were $\bar{x} = 4.11$ (S.D. 0.86) which be in the good quality criteria and the results of comparing the learning achievement when learning with the developed teaching set were found that the achievement of post-test score was higher that the pre-test with statistically significant at .05 Therefore, the satisfaction assessment results of the learners are at a high level. ($\bar{x} = 4.38$, S.D. = 0.63). Thus, the developed online instructional package by simulation- based learning on electro-pneumatic system can be used with high quality.

Online full paper: **https://bit.ly/3kNawvr**
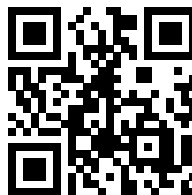
Development and Construction of a Solar Drying Plant for Drying Coffee Beans.

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Nowadays, most farmers will dry coffee bean by advantage of the hot weather. It takes 15-20 days to dry each coffee depending on the weather conditions, if drying is unable to dry the coffee beans, it will affect the coffee bean mold and its low quality. Therefore, the researcher has designed a solar-powered drying plant for drying coffee, size 6x9 meters. It consists of 6 8-inch ventilation fans and has a temperature control set that does not exceed 50 degrees Celsius. The experiment was able to maintain the maximum temperature inside the drying house at 50.6 °C and relative humidity 80 %RH. The results of the experiments between coffee beans in the laboratory and the coffee beans that were naturally dried can be calculated standard dry humidity, starting at 157.532 %db, using a period of 6 days, humidity reduced to 10.976 %db. From the experimental results, it was found that the drying time using the drying house was shorter than that of the natural drying and thus preventing mold in the coffee beans because it can reduce humidity faster and used 13.78 kWh of electricity to dry coffee for 16 days.

Online full paper: **https://bit.ly/3x4nvvb**

A Study of the Influence of Variables on Surface Roughness in the Machining Process of M2 High Speed Tool Steel

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Objective of this research was to study the influence of variables on surface roughness in machining, stripping of high-speed tool steel M2. Factors used were 2 levels of cutting speed: 100 and 120 m / min. 0.12mm / rev the two levels of feed depth, 0.4 and 0.6 mm, were used in $2^{(3-1)}$ Fractional Factorial Design The study factors affected the surface quality. The surface roughness is according to DIN 3141 standard, arithmetic mean between N4-N7, surface roughness 0.2-1.6 microns. The factor influencing the surface roughness of the turning surface was that the depth feed was statistically significant to influence the surface roughness at the level 0.05 and the optimum value was the cutting speed of 100 m / min, feed rate 0.12 mm / rev. And a feed depth of 0.4 mm, which yielded an average surface roughness Ra of 0.281 microns.

Online full paper: **https://bit.ly/3iI4HNc**
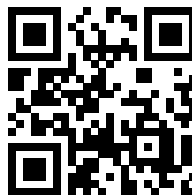
A Study of Factors Affecting Surface Roughness in Low Alloy Steel Turning SUJ2 Grade

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The Objectives of this research was to study factors affecting Surface Roughness in Low Alloy Steel turning SUJ2 grade using inserts (PVD-coated carbide types) by using the method of turning, peeling the work piece surface. The factors used in the study were cutting speed which consisted of 3 levels: 110, 130 and 150 m./min and Feed Rate consisted of 3 levels: .05, 0.10 and 0.15 mm./rev. Depth of Cut consists of 2 levels, 0.8 and 1.0 mm. The dependent variable is the turning Surface Roughness. The results showed that Main Effect Cutting Speed does not affect the Surface Roughness. Depth of Cut and Feed Rate, which affects the Surface Roughness. Statistically significant at the level of 0.01, and the Interaction Effect Depth of Cut and Cutting Speed, Depth of Cut and Feed Rate, Does not affect the Surface Roughness. Cutting Speed and Feed Rate, which affects the Surface Roughness. statistically significant at the level of 0.05, and the Depth of Cut, Cutting Speed and Feed Rate, which affects the Surface Roughness. Statistically significant at the level of .01

Online full paper: **https://bit.ly/3eP1URd**

The Application of AHP in the Selection of Substrate for the Preparation of Fibers from Kapok

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The objective of this research was to create a model for deciding on the preparation of kapok fibers to be used as the production of diapers instead of synthetic fibers by using the Analytic Hierarchy Process (AHP). The criteria for consideration are water absorption porosity and cellulose content of fibers. The three substrates were prepared: sodium hydroxide (NaOH), hydrochloric acid (HCl), and sodium hypochlorite (NaClO). According to the study results, it was found that the most important criteria were porosity, water absorption and cellulose content respectively. HCl as a substrate had the greatest effect on porosity, water absorption and cellulose content, followed by NaClO and NaOH respectively.

Online full paper: **https://bit.ly/3zGxLfd**
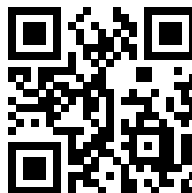
Development and Construction of Low Temperature, Low Relative Humidity Drying Room for Coffee Bean Drying.

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The aim of the project was to develop the processing of drying coffee beans by using of low temperature and relative humidity (LT-LH). The dryer had 3.6´4.8´2 meters (Length´Width´Height) and pre-insulated panels are building materials. The building system consists of air conditioner 1 ton of refrigerant, dehumidifier 20 liters per day, 8-inch ventilation exhaust fan and 18-inch ceiling fan which can control temperature at 20 °C with the relative humidity 40 %RH. For each drying method, 30 kilograms of arabica coffee beans were used. From Ban Mae jam Community Enterprise, Lampang. The result showed that initial moisture content of coffee beans was 63.80% wb (wet basic) and 176.48 %db (dry basis), which it took 22 days can reduce moisture to 10.436 %wb. Furthermore, an average drying rate (DRmean) was 0.0.00899 kgwater/h. , an average specific moisture extraction rate (SMERmean) was 0.0148 kgwater/kW-h.The average room temperature was around 19.4°C with the relative humidity 42.1%RH. In addition, the energy consumption for coffee beans drying by using of LT-LH method was 295 kW-h.

Online full paper: **https://bit.ly/3rt9G8B**
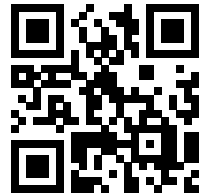
Development of Gravity Force Compensator in Haptic Hydraulic System

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This article presents a robot that can work very closely with humans. and can create a feedback force to make humans perceive as well What are the things that are doing now? Hard, soft, heavy or light? Haptic devices are used as virtual reality technology applied to the study of engineering fundamentals. The research team therefore has an idea to study and design a control system for haptic robots. And a haptic robot was used to develop control from an electric motor. Change to hydraulic control To study and design create weight compensation in haptic hydraulic systems. To reduce the perceived tolerance of a force or pressure, the principle is that a device measures the force and torque that the user exerts at the end of the haptic device, sending the force value to process the movement of the robot. In the form of distance and speed corresponding to the movement of the virtual object (Virtual Object), send the motion value to the robot controller for use in remote control of the robot. It controls the movement of objects and provides the robot's responsive feedback to humans, consisting of a 3 DOF delta robot and a Slave 4 DOF robot using hydraulic power. The Delta 3 DOF robot controller generates and controls the force using the 6 Axis Force using Fx, Fy and Fz force sensors while the 4 DOF (Slave Robot) hydraulic robot senses force from the sensor. Pressure sensor sent to the controller (Reflecting Force) study and design results to compensate for the working force of the 3-axis delta robot: Adaptive Fuzzy can control the force as needed. And take the control you want as well

Online full paper: **https://bit.ly/2V6Ffca**
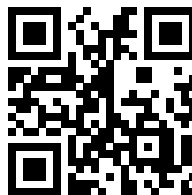
The Humidity Control for Farmbot

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Abstract The humidity control system for Farmbot, is designed to implement automation systems in agriculture. The concept working of farmbot automation is similar to Cartesian Robot which has a working area of 0.7 meters wide, 1 meter length and 0 . 8 meters height. The system can control the moisture in the soil and adjust the balance of soil moisture conditions under various environments. The tools that are using for the automatic farming plants such as seeders, watering, and soil moisture sensors are connected to the robot by using the main gripper, also known as the Universal Tool Mount (UTM) by using a magnetic force to connect between various devices. The system consists of a processor, control, web application, and user interface by using wireless communication technology to connect various parts of the system. The system can be combined automatically with the ability to control soil moisture suitable for crop and including the ability to control the amount of water according to the needs of plants.

Online full paper: **https://bit.ly/2UxkYNf**
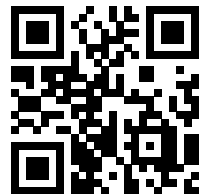
Information and Computer Technology

เทคโนโลยีสารสนเทศ และคอมพิวเตอร์

NCTechEd13   **ICT01-ICT17**

The Construction and Quality of Radio Receiver Teaching Packages According to the Vocational Certificate Program

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This research aims to 1) develop multimedia teaching series. Radio receiver class 2) to study the efficiency of multimedia teaching series Radio receiver class 3) to study the achievement of learners with multimedia teaching series. Radio receiver class 4) to study the satisfaction of learners with multimedia instruction set. Radio receiver The sample group was vocational students. Department of Electronics Chana Technical College A total of 30 people who had previously enrolled in the radio receiver course were using a specific random sampling method. Radio receiver by experts 2) a pre-study test Exercises during class and a test after study 3) the student satisfaction questionnaire The results of the research were as follows: 1) the quality of the multimedia instruction set. Radio receiver The content quality was very good ($\bar{x}$= 4.56, SD = 0.5) and the technical quality was good ($\bar{x}$= 4.44, SD = 0.66). taught radio receiver Efficient 80/76 percent, which is higher than the set benchmark is 75/75 3) learning with multimedia teaching series. Radio receiver This resulted in a statistically significant increase of the students 'achievement at the .05 level and 4) the students' satisfaction in learning with multimedia instruction set. Radio receiver Overall, it was at a very good level ($\bar{x}$ = 4.54, S.D. = 0.52).

Online full paper: **https://bit.ly/3BB69tm**
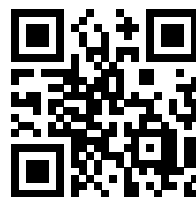
The Effect of Board Game to Enhance Problem Solving Thinking in Computing Science Courses on Step-By-Step Problem Solving Topic for Late Elementary School Students

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This objectives of this research were to 1) to compare problem-solving thinking between before and after of students studying with board games. 2) to study the satisfaction of students studying with board games to enhance problem solving thinking. This research Using This research Using developmental research, (Richey and Klein,2007) and One Group Pretest Posttest Design. The sample group study was the 14 students in late elementary school students at Bankudyang School who are studying in academic collected by Purposive sampling. The research instruments consisted of 1) board games "JUMP FOR BABY FROG" to enhance problem-solving thinking for Late Elementary School Student. 2) Pre-test and post-test problem-solving questions 3) A survey on the satisfaction of students studying with board games. The results showed that 1) The results of the to compare problem-solving thinking between before and after of students studying with board games that Enhance Problem Solving. When comparing the results of the students' problem solving, it was found that Problem solving after class is higher than problem solving before class. 3) Student satisfaction study results with board games to enhance problem-solving thinking. It was found that the overall satisfaction of students was at a high level ($\bar{x}$ = 4.42, S.D. = 0.33).

Online full paper: **https://bit.ly/3iCnNo9**

The Results of Learning Management Online Learning using Project Based Learning to Enhance Computational Thinking in The Course C Programming

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The objectives of this research: 1) To develop a lesson on a project-based network that promotes computational thinking in the course. C programming language 2) To compare the computational thinking of learners who learned through network lessons with those who organized normal teaching activities. 3) To compare the learning achievements of those who studied with 4) To study the relationship of computational thinking and learning achievement of the learners who learned through the network lessons with the group of learners who organized the activities. Normal teaching and learning. and 5) To study the satisfaction of learners towards learning with lessons on the network. The sample group used in this research was the Mathayom Suksa 4 students selected purposive sampling from the population from 2 classrooms to be the experimental group, 1 classroom and the control group 1 classroom, but each student had the same context. have the same basic knowledge and abilities The lessons on the project-based network that promote computational thinking were developed according to the project-based learning management process (Wongsuwan, 1999), namely 1) set the topic 2) plan 3) act 4) write a report and 5) results presentation. The researcher has applied the computational concept of Angeli, 2016) added to the 3rd step of the project. This was to allow learners to start writing a program according to computational thinking steps, namely 1) designing an interaction screen, 2) instructions used, 3) designing work in each sub-section, 4) designing algorithms, and 5) checking. The expert results show that the quality of the lessons was at a "very good" level ($\bar{x}$= 4.31, S.D. = 0.58). The group of learners who studied with network lessons had a statistically higher average than the control group mean at .01 level. The network mean was significantly higher than that of the control group at .01 level. The study of the relationship between the computational thinking and the learning achievement of the sample group was found. There was a high relationship (r = 0.724). The satisfaction study of the learners who took lessons on the network showed that The students had overall satisfaction with the network lessons at a "very satisfied" level ($\bar{x}$= 4.18, S.D. = 0.83).

Online full paper: **https://bit.ly/3rvAZz3**

A Vocational Education Graduates's Job Status System

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Status of graduate employment is important information for developing the bachelor's degree programs of The Office of the Vocational Education Commission to correspond with entrepreneurs' needs. The current data cannot be used as a graduate database, according to a variety of data collection tools which are not the same format, both in document and online form. The objectives of this study were to develop the database of the situation of employment, unemployment and continue studying, and to collect entrepreneur satisfaction data of vocational graduates via web application.

The result of this study found that the access to the web application is easy and convenient for users to update information and complete surveys. In addition, this web application is available on various devices and fast generated report data. The results of the evaluation of specialist satisfaction of vocational graduates was in a high level at average 4.46 (S.D. = 0.50). In conclusion, the developed database can be used as a graduate database for improving the bachelor's degree programs to correspond with entrepreneurs' needs.

Online full paper: **https://bit.ly/3eMWma1**

Cognitive Tools to Promote Student Programming During The Covid-19

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This article presents the application of cognitive tools to promote student programming during the Covid-19. The researcher used the development research process to improve learning management methods that use the ADDIE Model theory combined with cognitive tools. The objectives of this research were as follows: 1. To design learning management that uses ADDIE Model theory combined with cognitive tools. 2. To compare the scores of students' programming ability before and after studying with the learning management. The sample group used in the experiment was 28 first-year Computer students, Faculty of Education, Nakhon Si Thammarat Rajabhat University, the simple random sampling using the classroom as a random unit. The results of the research were as follows: 1. The learning management process consists of 9 steps and 10 cognitive tools are used. The cognitive with basic features based on computer learning mobile devices and software can learn in an interactive environment. 2. The students significantly score higher in programming at .05.

Online full paper: **https://bit.ly/3BAaCgb**

ICT06:NC25

Rice Leaf Disease Detection Using Convolutional Neural Network for Android Operating System

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This research paper on Rice Leaf Disease Detection Using Convolutional Neural Network for Android Operating System is a study of rice plant diseases, especially leaf diseases that can damage rice plants and lead to decreasing rice yields with the introduction of image processing technology using convolutional neural networks (Convolutional Neural Network: CNN) capable of simulating human vision used for the detection of rice leaf disease or leaf disease. It can detect 2 types of diseases: Brown Spot Disease and Bacterial Leaf Blight Disease. By bringing the mentioned sample disease pictures to practice to make a model for each 160 pictures, total 320 pictures, and the samples from the model testing for each 20 pictures, total 40 pictures. This research paper uses the MobileNetV1 model. The MobileNetV1 model itself is small and has high accuracy. The success rate for disease identification of rice plant leaves was 97.5%.

Online full paper: **https://bit.ly/3zvRr51**

A Study on the Problem Conditions and Needs of Robot-based Learning

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The purposes of this research were to: 1) explore the problem conditions and needs for robot-based learning and 2) compare gender differences based on the problem conditions and needs for robot-based learning. The samples were 97 pre-service students, studying in major of Computer Engineering, in department of Electrical Technology Education, and faculty of Industrial Education and Technology at King Mongkut's University of Technology Thonburi during 2013-2018. The samples were selected by purposive sampling technique. The questionnaire was used as a tool for data collection and evaluated by three specialists with the index of item objective congruence (IOC) between 0.67 and 1.00. The statistic adopted for this thesis was an average, percentage, and standard deviation. The results showed that in overall, female and male students had the same opinions, which the problem conditions were at a moderate level and needs were at a high level. Based on considering the sub aspects, the results in terms of the problems demonstrated that 1) Female students revealed that programming was difficult. 2) They also were unable to understand the lessons on their own and thus need helps from other learning resources. 3) Female students did not have enough basic knowledge to learn by using robot-based learning on a high level. In terms of needs, the results showed that females expected to promote learning by having enough internet broadcasting devices to be used in teaching and learning meanwhile males expected a classroom to be able to carry out subject activities during off-school hours on a highest level.

Online full paper: **https://bit.ly/2V4bQPR**
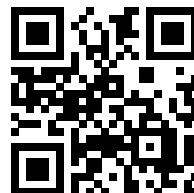
The Development of Virtual Laboratory for Subject of Rectifier Electronic Circuits I for Sophomore Course with Bachelor of Science in Technical Education (Revised course, 2015)

Chaiya Tanaphatsiri, Bussarakam Tongpet, Kravee Anontree, Yoowadee Aramruang, Jenjira Kaewsuk

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Abstract The objectives of this research were 1) to develop a virtual laboratory for subject of rectifier electronic circuits I for sophomore course with bachelor of science in technical education (revised course, 2015) 2) finding the effectiveness of the virtual laboratory classroom 3) to study the learning achievements of the learners and 4), the satisfaction of the learners who studied with the virtual laboratory classroom. The population are the second year undergraduate students in electronics and telecommunications engineering in faculty of industrial education and technology in Rajamangala University of Technology Srivijaya. The research instruments included 1) the virtual laboratory 2) the content quality and technical quality assessment form of the media by experts 3) the testing for measurement in academic achievement (pre-post-study test) 4) a learning performance testing during study state; 3) an assessment of student satisfaction towards the teaching and learning process using a virtual classroom. The results of the research showed that 1) the quality of the virtual laboratory classroom was good ($\bar{x}$= 4.38, SD = 0.77) and the technical quality was good ($\bar{x}$= 4.39, SD = 0.79). The effective 77/80, which was higher than the 75/75 benchmark. 4) The learners were satisfied with learning using a virtual laboratory classroom very good ($\bar{x}$= 4.59, SD = 0.52)

Online full paper: **https://bit.ly/3Bshxbb**
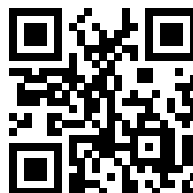
ICT09:NC37

The Development for Online Learning Kit using a Learner-Centered Model and Integration with Inductor Course of Electrical Circuit Analysis in Bachelor of Industrial Education Program

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Nutsara Khuntong, Sarayut Pradubjun, Tanachai Keawsongmaung
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This research aims to 1) create an online learning package using a learner-centered model (CIPPA model) integrated with an active learning model for inductance course 2) find the effectiveness of the online learning package 3) assess the satisfaction of learners. The sample groups were 1st year students, RUTS, semester 1/2020, total 51 students. The sample size was determined using the Taro Yamane formula for the calculation at 95% confidence using stratified random sampling. The research instruments were 1) the quality assessment form of the online learning package via model of the learner centered (CIPPA Model), integrated with the active learning model of inductance course 2) quiz before study post-test and exercises during class 3) student satisfaction questionnaire.

The results showed that: 1) the content quality is good ($\bar{x}$ = 4.38 SD = 0.49) and the technique quality is at a good level. ($\bar{x}$ = 4.20 SD = 0.68). the efficiency of the online learning suite using a learner-centered model (CIPPA model) integrated with an active learning model on inductance course It has an efficiency of 85.20/90.88, which is 80/80 higher than the established benchmark 3) learners are satisfied with learner-centered model (CIPPA model), integrated with the active learning model, was good ($\bar{x}$ = 4.44, SD = 0.52).

Online full paper: **https://bit.ly/3ycU2AA**
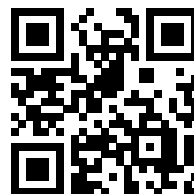
Teachers's Competency Exam Tutoring System for Student Teacher Program in Industrial Education Using Multimedia Online Course on Smart Phone

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Objective of this research is to 1) develop a professional teacher competency exam system for industrial teacher students using multimedia online on smartphone application 2) finding the achievement of students for internship teacher education using multimedia online course on smartphone 3) study the satisfaction of them which the professional teacher. The sample for this research was a 4th undergraduate student in electronics and telecommunications engineering of Rajamangala University of Technology Srivijaya, with 52 students in 2 classes for specific sample (Purposive Sampling). The tools were used for this research were consisted of 1) the Teacher Professional Competency Examination System for Industrial Technician Teachers using lessons of multimedia via smartphone 2) the media quality assessment form experts 3) pre-post-study and 4) the student satisfaction questionnaire. The data were analyzed by using statistics to find mean and standard deviation

The results of the research were follows as: The professional teacher competency exam system for industrial teacher students using multimedia online on smartphone application 1) content quality is good ($\bar{x}$ = 3.85, SD = 0.54) and 2) quality. The technical aspect is good ($\bar{x}$ = 3.98, SD = 0.58) 3) the learning achievement of the learners using the Professional Teacher Competency Examination System for the Industrial Technician Teacher Students using lessons. Online multimedia on smartphones was significantly higher at the .05 level 4) The students were satisfied with the learning by using the professional teacher competency exam system for students, teachers, industrial technicians using lessons Online multimedia on smartphones is good ($\bar{x}$ = 4.26, SD = 0.83)

Online full paper: **https://bit.ly/3zvRFcn**
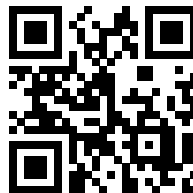
The Development and Effectiveness of Computer Assisted Instruction for Multimedia Game to Promote Recognizing using QR-Code Technology on Resistive Load for Basic Skills in Electrical and Electronics for Bachelor of Industrial Education Program in Electrical Engineering

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The objectives of this research were to 1) develop a game-based multimedia computer-assisted instruction for multimedia game to promote recognizing using QR-code technology on resistive load for basic skills in electrical and electronics for bachelor of industrial education program in electrical engineering 2) to study the efficiency of computer-assisted instructional multimedia lessons and promote memorization by applying QR-Code technology on resistive load 3) to study the learning achievement of learners who study with computer-assisted multimedia lessons like games and promote memorization by applying QR-Code technology on resistive load and 4) study the satisfaction of learners with a game-like multimedia computer-assisted lesson for promote memorization by applying QR-Code technology on resistive load The sample was first year undergraduate students in the field of electrical engineering with 52 students in the bachelor of industrial education in electrical fields enrolled in the basic electrical and electronic skills courses in the academic year 1/2020

Using the quota sampling method: 26 students in class 1-2 students of 26 students. The instruments used in this research consisted of 1) computer-assisted multimedia lessons 2) the media quality assessment form experts 3) Quiz before study quiz during class and post-study test and 4) a satisfaction questionnaire for learners and data analysis using statistics for the mean and standard deviation The results of the research were found that 1) computer-assisted multimedia lessons in games to promote memorization by applying QR-Code technology on resistive load developed by the researcher overall was good content quality ($\bar{x}$= 3.60, SD. = 0.72) and technical quality was medium level ($\bar{x}$= 3.22, SD.=0.72) 2) the teaching and learning process using game-like multimedia computer-assisted courseware to promote memorization by applying QR-Code technology on resistive load has efficiency 75.24/76.07, higher than the specified benchmark, that is 75/75. 3) The teaching and learning process using a game-like multimedia computer-assisted lesson to promote memorization by applying QR-Code technology on resistive load got higher academic achievement The students were satisfied with the learning process using the multimedia game-based computer assisted learning process and promote recognition by applying QR-Code technology on resistive load at a good level. ($\bar{x}$ = 4.48, S.D=0.60)

Online full paper: **https://bit.ly/3wXQ91i**

The Study of Gamers' Satisfaction Was Created Using a Character Design Technique That Combines People and Animals in A Side Scrolling Style

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The study of gamers' satisfaction was created using a character design technique that combines people and animals in a side scrolling style. Which aims to study character design, blending people and animals in a side scrolling style game and evaluate the satisfaction of those who played the game. The result of a character design study that combines people and animals in a side scrolling style game found that the characters can be designed according to the objectives and the results obtained from the satisfaction evaluate from the sample group who came to play the game found that the overall design satisfaction score was at the most satisfactory level with an average of 4.51.

Online full paper: **https://bit.ly/2W4eghQ**

The Development of Multimedia Computer Assisted Instruction (MMCAI) Basic of Electric Course Multimeter Subject

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Abstract This research aims to 1) develop multimedia computer-assisted instruction. Multimeter matters Basic Electrical and Electronics Skills Course 2) A study of learning achievement of learners who took multimedia lessons with computer assisted instruction Multimeter matters Course in basic electrical and electronic skills and 3) Study the satisfaction of learners with multimedia computer-assisted lessons. Multimeter matters Course in basic electrical and electronic skills The sample group used for this research was 61 first-year undergraduate students in Electrical, Faculty of Education, Industry and Technology, including 31 electrical and electronic and telecommunication fields. This contains1) Multimedia Computer Aided Lesson on Multimeters, 2) Media Quality Assessment Form, Multimedia Computer Assisted Lesson on Multimeter, 3) Pre-Study Test, and 4) Content Satisfaction Assessment Form. The meter analyzed data using specific sample selection statistics. The sample group consisted of 51 people, including electric power branches, 23 people, electronics and telecommunications branches, totaling 28 people The research results were found that1) Computer-assisted multimedia lessons on multimeter that the researcher developed, overall the content quality was at the Very good   ($\bar{x}$ = 4.63, S.D. = 0.49) and the technical quality was at the very good ($\bar{x}$ = 4.77, S.D. = 0.44) 2) Teaching and learning process using learning process with the multimedia lesson on multimeter Make the sample students Have a higher academic achievement With statistical significance at the .05 level, and3) The learners were satisfied with the learning process with the multimedia lesson on multimeter at a good level ($\bar{x}$ 3.99, S.D. = 0.83).

Online full paper: **https://bit.ly/3xW78SO**

Online teaching development By Using the program Google Class Room About infrared sensors courses Microcontroller and Internet of Things Bachelor of Industrial Education Program

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This research aims to 1) the online teaching developing using the Google Class Room via infrared sensors for microcontroller courses and internet of things in bachelor of industrial education program 2) find the effectiveness of online learning 3) find academic achievement of online learners 4) study satisfaction of learners who study online with total of 20 electrical power branches were selected for a specific sample. The results of the research were shown that 1) with a very good quality ($\bar{x}$ = 4.51, S.D. = 0.55). 2) an efficiency of 81.5/93, which is higher than the set criteria of 75/75 3) the learning achievement was significantly higher at the .05 and 4) The students were satisfied with the online teaching developing using the Google Class Room via infrared sensors for microcontroller courses and internet of things in bachelor of industrial education program were very good ($\bar{x}$ = 4.58 S.D. = 0.53)

Online full paper: **https://bit.ly/3i0yOjU**
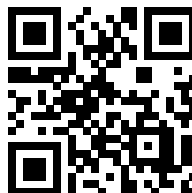
Developing and Testing of the Efficiency of Electrical Test Kits for Electric Circuit Analysis Course in Bachelor of Industrial Education Program

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The objective of this research is 1) to create 2) to find the efficiency 3) to study the achievement of of 1-phase and 3-phase electrical system experiment sets for electrical circuit analysis course in Bachelor of Industrial Education Program and 4) to study the satisfaction of the learners with the experiments sets that we mention it. The sample used for this research was the 46 fresh man of industrial education program under Rajamangala University of Technology Srivijaya enrolled in the electrical circuit analysis course in academic year 2/2020 by using quota sample selection method. The instruments used in this research consisted of 1) 1-phase and 3-phase electrical system experiments 2) Quality assessment form for experiment with electrical system phase 1 and 3 by experts. 3) pre/post test and 5 worksheets during class and 4) a student satisfaction questionnaire. The data was analyzed using statistics, mean and standard deviation. Efficiency was determined using the E1 / E2 statistics and t-test. The results of the research were as follows: 1) 1-phase and 3-phase electrical system experiment sets. Good quality ($\bar{x}$ = 4.45, S.D. = 0.65) 2) The teaching and learning process using one-phase and three-phase electrical system experiments. It has an efficiency of 78/86, which is higher than the established benchmark, that is 75/75 3) The teaching and learning process was done by using one-phase and three-phase electrical system experiments. Have higher academic achievement With statistical significance at the .05 level and 4) The learners were satisfied with the teaching and learning process by using the 1-phase and 3-phase electrical system experiment sets with good level. ($\bar{x}$ = 4.52, S.D. = 0.61)

Online full paper: **https://bit.ly/3iHq1m2**
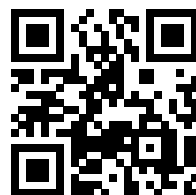
Development of Online Lessons Via Smartphone Applications. Transistor Electrical and Electronic Skills Bachelor of Industrial Education Program Department of Electrical Rajamangala

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The objectives of this research were 1) to develop online lessons through applications on smartphones. Transistor story Basic Electrical and Electronic Skills Course Bachelor of Industrial Education Program 2) Finding the effectiveness of online lessons through a smartphone application 3) Studying the learning achievement of learners who study with online lessons via a developed smartphone application 4) Study the satisfaction of learners who study with online lessons via smartphone applications. The sample group used in the research were undergraduate students. Electronics and Telecommunications Enrolled in the Basic Electrical and Electronics Skills course Bachelor of Industrial Education Program A total of 31 students were found. The research instruments consisted of 1) an evaluation form for content and technical techniques of media by an expert; 2) a pre-study test. and a post-study test 3) a satisfaction questionnaire. The results of the research showed that 1) the quality of online lessons through a smartphone application The content quality was good ($\bar{x}$ =4.25, S.D. = 0.77) and the technical quality was good ($\bar{x}$ =3.67, S.D. = 0.58).2) Studying with online lessons via a smartphone application resulted in a statistically significant increase in student achievement at the .05 level. 3) Students were satisfied with the lessons learned. online via smartphone

application in good level (average = 4.45, S.D. = 0.61)Keywords: online lessons via smartphone application, transistor

Online full paper: **https://bit.ly/3x0Wzg6**
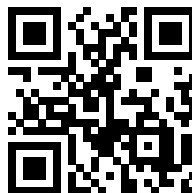
Development and Efficiency of the Blended Learning Kit of Bevel Protractor Instrumentation and Metrology Program, Bachelor of Industrial Education

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The proposes of this research were 1) to develop a blended learning kit of bevel protractor, Instrumentation and Metrology Program, Bachelor of Industrial Education 2) to test the efficiency of blended learning kit of bevel protractor, Instrumentation and Metrology Program, Bachelor of Industrial Education and 3) to study the satisfaction of learners who study with the blended learning of bevel protractor, Instrumentation and Metrology Program, Bachelor of Industrial Education. The sample groups were selected from a specific selection of 32 people of 1st year undergraduate students enrolled in first semester of academic year 2020 in industrial program, Faculty of Industrial Education and Technology, Rajamangala University of Technology Srivijaya. The instruments used in this experiment were 1) blended learning kit in topic bevel protractor, Instrumentation and Metrology Program and Dimension Science 2) quality assessment of the blended learning kit approval by experts. 3) achievement test in topic of measuring angles, Instrumentation and Metrology Program which comprises of pre-test and post-test. The findings revealed that 1) the blended learning kit of bevel protractor which comprised content sheets, worksheets, test pieces, and multimedia computer-assisted teaching materials in topic of measuring angles, Instrumentation and Metrology Program, approval by experts was at good level ($\bar{x}$ = 4.35, S.D. = 0.40) 2) the efficiency of the blended learning kit of bevel protractor by computer-assisted teaching lessons created by researchers, the program was effective according to the standard 80/80 . After studying with computer-assisted instruction, students have increased knowledge, efficiency of 80.31/81.56 which meets the specified criteria. And 3) learners were satisfied with the teaching and learning process using the blended learning kit of bevel protractor, Instrumentation and Metrology Program, Bachelor of Industrial Education, at a very good level ($\bar{x}$ = 4.62, S.D = 0.61)

Online full paper: **https://bit.ly/3iIz9GW**
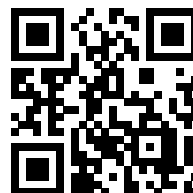
Education Management and Education Administration

การจัดการและการบริหารการศึกษา

NCTechEd13 **EMA01-EMA10**

The Study of Influence of Work Motivation on Organizational Engagement of Employees in The Motorcycle Industry in Thailand, Case Study of Thai Honda Manufacturing Co., Ltd.

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The Study of Influence of work motivation on organizational engagement of employees in the motorcycle industry in Thailand, case study of Thai Honda Manufacturing Co., Ltd., was aimed to study the influence of motivation in working towards the organization engagement of employees in the motorcycle industry in Thailand and to study the level of organizational engagement of employees in the motorcycle industry in Thailand. The closed-ended questionnaires were used to collect data. The sample consisted of 400 employees. Data were analysed through descriptive statistics including frequency, percentage, mean, and standard deviation as well as inferential statistics including statistics Independent-Samples T Test, One-way Analysis of Variance (One-way Anova), and Scheffe's pairwise analysis. The results of this study showed that the level of organizational engagement in the motorcycle industry in Thailand as a whole were high level. The hypothesis testing results showed the employees who had working period between 11-15 years that different personal factors including gender, age, education level, income per month level had no affected differently employees in the motorcycle industry in Thailand. It was found that employees with service year between 11-15 years have high level in organization engagement at significant level .05, secondly over 21 years, 16-20 years, 0-5 years and 6-10 years respectively.

Online full paper: **https://bit.ly/3hXQZXm**

EMA02:NC02

A Study of Organizational Management Factors That Influence Motivation in Work of Thai Workers in The Concrete Production Industry

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The objectives of this research were to investigate the influence of organizational management factors on work motivation of Thai workers in the concrete manufacturing industry and to study the motivation of Thai workers in the concrete manufacturing industry. The sample of this research consisted of 400 Thai workers in the concrete manufacturing industry. Data were analysed using statistics including percentage, mean, standard deviation, correlation coefficient analysis and multiple regression analysis The results of this study indicated that the samples mostly were males, aged between 18-30 years old, graduated with upper secondary school/vocational certificate, had 1-5 years of working experience. When the analysis of organizational management factors was conducted, a mean score was 3.84, which was at a high level. A mean score of work motivation of Thai workers was 3.73, which was at a high level. When demographic characteristics of the samples were compared, the samples with different years of working experience had different work motivation in terms of privacy with a statistical significance level of .05. However, other aspects did not influence. The correlation coefficient analysis of independent variables showed that work motivation of Thai workers was positively related to organizational management factor with a probability of 0.000 and a statistical significance level of .05.

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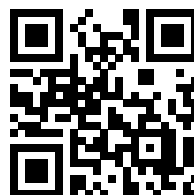
Academic Achievement on Bachelor of Engineering Courses of Thai-German Pre-Engineering School Graduates, King Mongkut's University of Technology North Bangkok

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The objectives of this research were : 1) to study demographic information, educational background, and academic achievement of the students at the Faculty of Engineering, and the College of Industrial Technology, King Mongkut's University of Technology North Bangkok (KMUTNB) 2) to compare the Grade Point Average (GPA) of engineering degree courses of students (Academic Year 2010-2019) who have different educational backgrounds, and 3) to investigate the correlation between the GPA of pre-engineering courses and the GPA of engineering degree courses. Research conducted by students'data from KMUTNB Registration Information System, and the statistical analyses were used. Research finding revealed that the total target groups of students were 4,736. The number of 2,733 students (57.7%) studied at the Faculty of Engineering while 786 students (28.8 %) finished pre-engineering courses. The students who graduated engineering degree courses were 2,233 (81.7%), while dropout students were 500 (18.3%). The target group of students who study at the College of Industrial Technology were 2,003 (42.3%) while 364 students (18.2 %) finished the pre-engineering courses. The number of 1,494 students (74.6 %) graduated from the engineering degree courses, while dropout students were 509 (25.4 %). Comparing GPA of engineering degree courses by the Independent Sample t-test between 2 groups of different background students showed the difference. The GPA of students from pre-engineering courses, Faculty of Engineering, was different from other courses at .01 level. However, there was no difference in the GPA of the students at the College of Industrial Technology. When the relationship between the GPA pre-engineering courses and the GPA of engineering degree courses by Pearson Product Moment Correlation (r) was analyzed, it was found out that there was a significant relevant relationship at .01 level for each faculty.

Online full paper: **https://bit.ly/3x093Ew**
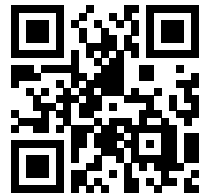
The Guideline of Health Service Business Entrepreneurship.
Case Study: Mitmaitree Medical Co; Ltd.

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This research aimed to study the history, operation, and problem solving in the business administration of the entrepreneurs of Mitmaitree Medical Company Limited and studied the personality, characteristics and concepts of corporate management of entrepreneurs. This research is a qualitative study with an in-depth interview. The results of the research can be summarized as follows: Chairman of the Executive Committee of Mitmaitree Medical Co., Ltd., have character traits as a successful entrepreneur with leadership, creative ideas, and plan to expand the more branches of business charecter. The current executives of this Company are characterized by positive thinking entrepreneurs, have the skills of management, applied the concept of organizational management (POSDC) including planning, organizing, staffing, directing and controlling.

Online full paper: **https://bit.ly/2Uym9fm**
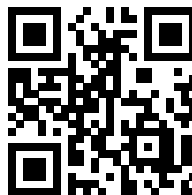
EMA05:NC09

A Study on Income Budget Management as Development Guidelines for King Mongkut's University of Technology North Bangkok

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This mixed methodology of both quantitative and qualitative research aimed at: 1) studying income budget management as development guidelines for King Mongkut's University of Technology North Bangkok, 2) investigating the opinions of administrators on the university budget management, 3) investigating the opinions of the operators in Budgeting Division on the university's budget management, and 4) suggesting guidelines to develop the income budget management of King Mongkut's University of Technology North Bangkok. The data were gathered from 30 administrators from every Faculty and 50 operators in Budgeting Divisions and the heads of the Office of the Dean through the questionnaires and in-depth interview with the results as follows. The operation of income budget should be separated from the annual government budget due to the fixed timeframe which can be spent according the annual plan. The estimation of annual income budget should be based on the analysis of the previous year income together with the current student number and the number of the prospective students. The income classification and distribution should be based on the proportion of the mission workloads and responsibility of each department or faculty. The operation of the income budget plan should be conduct promptly after the revision of the previous year government-budget plan. There should be a follow-up process to control the spending of the income budget through the 3-D accounting system in order to analyze the spending and find its trend. There should be a staff development training for the operators in the Budget and Planning Division. So, they can develop themselves particularly on more effective analytical operation.

Online full paper: **https://bit.ly/3iVAryP**

A Study of the Academic Achievement of 2ⁿᵈ Year Students of in Program of Production Techniques Using Exercises in Basic NC Program Course, Case Study of BDI Group

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The objective of this research was to study the academic achievement of students who studied by using the exercises in the second year of Diploma students (Vocational Certificate), Department of Manufacturing Techniques, Plastic Mold Field, Case study of Thai-Taiwan Technological College (BDI Group), Semester 2, Academic Year 2019, with 14 students. The tools used in the study were the exercises for basic NC program of 10 units, which the researcher has developed. The learning achievement test was used as a multiple-choice, choice-answer test, 10 items of 14 sets with the overall of average of 86.57%. To find out the performance, the exercise used the E1/E2 performance criterion equal to 80/80. The results showed that the efficiency of learning by using exercises in the basic NC programs was 86.57/87, which was higher than the set benchmark of 80/80. The student outcomes after learning by using the exercises found that they have skills and became aware of the subject being studied. As a result, students had higher academic achievement in basic NC program subjects.

Online full paper: **https://bit.ly/3zy8W53**

Required 21st-Century Skills of Holders of High Vocational Certificates in Automotive Mechanics from Nationwide Industrial Viewpoints

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The purposes of this research were (1) to identify the existing and required 21st-century skills from nationwide industrial viewpoints of graduates who hold high vocational certificates in automotive mechanics and (2) to compare the aforementioned existing and required skills. The study covered three aspects of skills: learning and innovative skills, information technology skills, and life and career skills. Participants were sampled from heads of personnel departments, chief mechanics, and mechanics in nationwide automobile service centers using a stratified sampling technique. The total number of samples was 480. Data collection was performed using a questionnaire while data summary was reported in terms of a percentage, a mean, and a standard deviation. Subsequently, statistical analysis was performed using a Z-test and one-way Anova. The result showed that the overall existing skills were at a moderate level while the overall required skills were at a high level. The difference between opinions about the overall existing skills from all three participant groups was statistically significant ($P < .05$) while the difference between opinions about the overall required skills from all three participant groups was not statistically significant ($P > .05$). Moreover, the difference between existing and required skills was statistically significant ($P < .05$). Specifically, the difference between existing and required information technology skills was the highest. Therefore, syllabuses for high vocational certificates in automotive mechanics should prioritize improving the information technology skills among the graduates.

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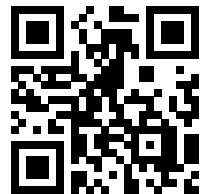
EMA08:NC48

Guidelines for Teaching and Learning Under the COVID-19 Situation King Mongkut's University of Technology Thonburi

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The objective of this research is to study the way for teaching and learning approach under the COVID-19 epidemic situation of instructors at King Mongkut's University of Technology Thonburi. A group of the key informant was 22 instructors at King Mongkut's University of Technology Thonburi of Bang-mod campus, who had passed the UK Professional Standards Framework in Senior Fellow level from convenience sampling. The research tool was a semi-structured interview, data collected by In-Depth Interview and content analysis. The results found that the interviewees most of them were 59.09% male, with an average age of 46 years, an average teaching experience of 19 years and an average of 1 year of teaching experience during the COVID-19 situation. The results of guidelines for teaching and learning in the field of the Feeders; instructors and facilities, Process; teaching preparation, teaching operation, and evaluation, Output, and other issues. The instructors are required to study, learn more about the online teaching method, prepare facilities for online teaching. Practical subjects need to adjust the lab usage intervals at times appropriate to university requirements. Teaching processes need to be planned to fit online learning. Interesting teaching materials are made into short video clips divided into sub-chapter and handouts must be available. Most of the instructors use flipped classroom teaching method through ZOOM and MS Teams for teaching and use You-tube, Facebook, Google Classroom, Google Drive, and LEB2 for the submission of information for teaching and learning. It is designed to interact and participate in learning activities, create collective agreements, and promote morality to reduce the problem of cheating on examinations. The evaluation should be flexible and appropriate to the course and the productivity should focus on measuring the results obtained from the feedback based on the Learning Outcome topic set by the instructor. The study can be used as information or a guideline to prepare the teaching to be effective under this circumstance.

Online full paper: **https://bit.ly/3iIcYke**
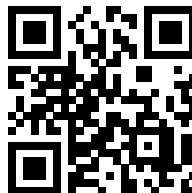
Strategies Adaptation of Medium Printing Business Entrepreneurs in The Digital Era

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Suan Sunandha Rajabhat University, Thailand

Research on adaptation strategies of medium printing business entrepreneurs in the digital era It is a qualitative research. The objectives of this research were: 1.) to study the adaptation strategies of medium printing business entrepreneurs in the digital era; 2.) to compare the selection of adaptation strategies of medium printing business entrepreneurs in the digital era. Classified by business model and number of employees The samples used in this research were medium printing business entrepreneurs in Dusit area. Bangkok, 40 people were acquired by specific selection. They are entrepreneurs with the following characteristics: 1) entrepreneurs with a sole proprietorship registration 2) entrepreneurs with limited partnership registration 3) entrepreneurs with a sole proprietorship registration limited company The statistics used to analyze the data are the arithmetic mean. standard deviation and testing T – test dependent. The results of the study showed that 1) the adaptation strategies of medium printing business entrepreneurs, overall, it was found that the overall level was at a high level. classified by aspect It was found that the production process was the first is to check the print quality at every step. Personnel first is to evaluate the performance of employees The financial aspect is budget planning, marketing is the first to adjust new marketing strategies and create new management products. is to set up a systematic organizational structure The first raw material 2) Comparison of selection and adjustment strategies of medium printing business entrepreneurs classified by business model and number of employees found that medium printing business entrepreneurs Classified by business model There are different adaptation strategies. Except for marketing, there were statistically different adjustment strategies at .05 level. The adjustment of medium printing business operators classified by number of employees had no different adjustment strategies.

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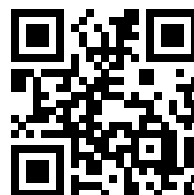
Development of E-Learning on Timber and Steel Materials Testing Comply with Construction Standard

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The objectives of this research were 1) to create a manual for testing timber and steel materials according to the standards in construction; 2) to create and find the efficiency of E-Learning lessons, to test timber and steel materials according to the standards in construction; 3) to study the opinions of students towards E-Learning. The sample group used in the research were 3rd year undergraduate students of Civil Engineering and Education program, Department of Teacher Training in Civil Engineering, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok, in the second semester of 2017 enrolled in the Course Materials and Testing by selecting a specific type of 30 people. The research instruments consisted of 1) a manual for testing timber and steel materials according to construction standards; 2) an E-Learning lesson, testing timber and steel materials comply with the construction standard. 3) Exercises and achievement tests. 4) Questionnaire on the opinions of students towards the lesson. The research is experimental research by having the sample group take a test before studying. Then study the content with ten units of E-Learning lessons, doing exercises in each unit. After completing the course, take the test after the class. and opinion questionnaire

The results showed that the manual for testing wood and steel materials according to the construction standards is appropriate. The built-in multimedia computer-assisted teaching system has an efficiency of 85.05/83.50, above the 80/80 threshold when considering academic achievement with this lesson. After studying ($\bar{x}$ = 16.7, SD = 1.76), the learning achievement was significantly higher than before ($\bar{x}$ = 8.70, SD = 4.40) at the .05 level, and the students' opinions on the E-Learning lesson were reasonable ($\bar{x}$ = 4.19, SD = 0.62)

Online full paper: **https://bit.ly/3eNG6Wg**
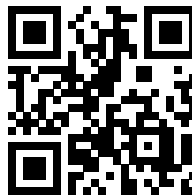
ICTechEd8

8th International Conference on Technical Education

ICTechEd8

Session A

July 8, 2021
13.00 – 15.00

Contemporary Strategic Tools in Construction Companies Context

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The purpose of this study is to review strategic tools presently implemented in construction companies. The paper examines the perspectives of construction engineers, managers, and employees of the construction companies in Bangkok Metropolitan Region towards strategic planning and tools. Focus group discussions were used to derive the strategic tools and were later used in the subsequent online survey. Pearson chi-square test was used to analyze nominal data and check the significance of the statistical difference between the variables. The vision, mission, and strategy have been acknowledged in most construction companies today. The best strategic planning and process required a combination of top-down and bottom-up approaches. It is important to discuss the way in which the management and employees understand and make a decision regarding the strategic management.

Online full paper: **https://bit.ly/3ztYATs**

IC08_11
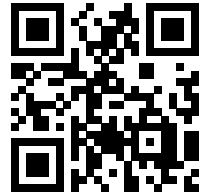
An Improved Multi-Reservoir Operation using Gridline Operating Rule for Water Management in Chao Phraya River Basin

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The release of water from the multi-reservoir system in the Chao Phraya river basin is extremely important irrigation area of Thailand with a large volume of water use. There are only four water sources, Bhumibol, Sirikit, Khwae Noi Bumrungdan, and Pasak Jolasid reservoirs. the operators have to decide when and how to release water together for the water allocations of the Chao Phraya river basin. The development of a decision-making model for optimal multi-reservoir release in the Chao Phraya river basin based on the Gridline Operating Rule (GOR) concept, will be a useful tool that will help the decision makers to release water properly. The objective is to reduce discharge peak at Control Point C4 and water shortages in the irrigation areas. Water allocation was also evaluated by using reliability, vulnerability, and resiliency indices. The calibration period, GOR-HS with three indices values of 74%, 452 million cubic meters (MCM), and 46%, respectively. In addition, it has reduced the flooding period in 2011 by 16 days amounting to 819 MCM and peak discharge 192 cms of water which could have affected the area.

Selected paper for International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies
Online full paper: **https://tuengr.com/**
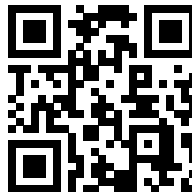
IC08_05

Preliminary Curriculum Design for an Indonesian Master of Engineering Program on Public Infrastructure Asset Management

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Infrastructure Asset Management need to be well implemented in Indonesia. Thus, the knowledge and science of IAM need to be developed and taught. A Master Program on it need to be established with a well-designed curriculum. This must be designed based on related regulations and the nature of IAM itself. IAM System deals with the infrastructure, the managing body and the related case. The knowledges needed can be divided into the core and the supporting knowledges. The core knowledges consist of knowledges on what have to be done to the infrastructure in order to achieve the IAM objective. While the supporting knowledges are the knowledges needed to do the core knowledges. Afterward, the curriculum is designed for 4 semesters with 36 units, and ended with a Thesis work of 6 units.

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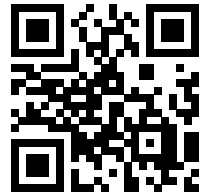
Optimized Deep Learning Procedure by Adaptive Parameters Based Genetic Algorithms for Determining Reservoir Inflow

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The determination of the reservoir inflow would be directly affected the efficiency of reservoir operation. Artificial intelligence techniques such as Artificial Neural Networks, Deep Learning (DL), and Genetic Algorithms (GAs) have been applied to many case studies of water resource management, for example, the determined relationship between rainfall and runoff, and rainfall forecast. DL has been successful for the rainfall-runoff model, but the performance of the model depends on its parameters that take more time-consuming for model development, and difficult to determine the optimum values. This paper presents the development of the Adaptive Parameters Based Genetic Algorithms (APGA) model to explore the optimum procedure of deep learning for reservoir inflow simulation for the Kaeng Krachan Reservoir and compare performance with the Adaptive Probabilities of Crossover and Mutation Genetic Algorithm (AGA). The current study found that the mean absolute percent error (MAPE) of the reservoir inflow from APGA was lower than AGA in all periods, so the optimum DL procedure from APGA outperforms AGA, while the DL layer architecture from APGA was more complex than AGA. In summary, APGA may be suitable for determining optimum DL procedure than AGA, but pc and pm parameters should be studied in the future.

Selected paper for International Transaction
Journal of Engineering, Management, & Applied
Sciences & Technologies
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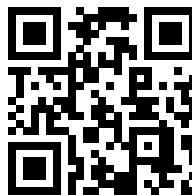
IC08_06

Optimization of PID Controllers in a Brushless DC Motor System with IWOA

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Brushless DC motor system is important in the industry. And PID controller is the most widely used controller. In this research paper, Improve Whale Optimization Algorithm (IWOA) using Whale Optimization Algorithm (WOA) in conjunction with Momentum + Stochastic Gradient Descent to adjust PID's constant to increase work efficiency and convergence with consider efficiency from the instantaneous response of a brushless DC motor system. The results were compared with Ziegler-Nichols (ZN), The Whale Optimization Algorithm (WOA). And tested with disturbance noise. The IWOA was found to be more efficient and convergent ZN and WOA.

Online full paper: **https://bit.ly/3rCnOws**
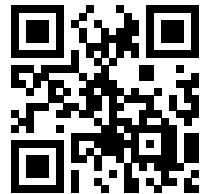
Clustering Student Performance Based on Family and Educational Backgrounds: A Case Study of the Faculty of Agriculture and Technology at Rajamangala University of Technology Isan

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Today, a number of students studying at the university play a vital role in assisting the university continue its status as an educational institution. Thus, the comprehension of student's family and educational backgrounds is extremely important to retain a number of students on campus. This objective of research attempted to study student's data collected from the Education Service System (ESS) of Faculty of Agriculture and Technology at Rajamangala University of Technology Isan by only regarding their family and educational backgrounds through clustering with k-means and hierarchical clustering before admission. The results of clustering were classified into two groups consisting of graduate students and dropout students. Results clearly showed that the data collected from ESS relating to family and educational backgrounds were insufficient for clustering. However, the results of this study can be used to assist the faculty to develop a database in ESS in the future.

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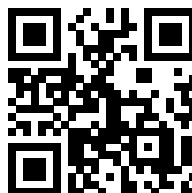
ICTechEd8

Session B

July 8, 2021
13.00 – 15.00

The Development of Motivation Skills for Students in Professional Experience I in Electrical Engineering, Faculty of Technical Education, King Mongkut's University of Technology North Bangkok

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The purposes of this study were to develop the motivation skills of students to practice professional experience. The researchers used participatory action research processes based on Kurt Lewin's spiral staircase theory. The researcher performed two cycles, each of the cycles has six steps: Step 1 Identifying a general or initial idea, Step 2 Reconnaissance or fact-finding, Step 3 Planning, Step 4 Take the first step, Step 5 Evaluate and Step 6 Amended plan. The person who took part in the research was a third-year undergraduate student enrolled in the Professional Experience I, Semester 1/2020 of King Mongkut's University of Technology North Bangkok, and supervisors of this subject. The researcher plans the student's practice by having students act as teachers. In addition, the researcher assigned students to do 3 worksheets. In each worksheet, students will write a concept of the subject that will be taught, write summarize motivation, practice questioning, and practice using motivation tools. The research results from the process make motivation skills of learners to the point, thus creating greater interest in motivation. Therefore, two exam supervisors give motivation test scores were higher than 80% of the full score, and Cohen's Kappa (κ) or Rater Agreement Index was 0.824. The satisfaction of the students received the assessment results of all items at the very satisfied (mean = 4.81, S.D. = 0.16).

Online full paper: **https://bit.ly/3eNTidz**

Impact Results of Using Electronic Evaluation Portfolio with Feedback Data for Students of Technical Teacher Training Program

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This research, the authors aimed to 1) develop electronic evaluation portfolio with feedback data for student of technical teacher training program. 2) evaluate the efficiency of the developed electronic evaluation portfolio with feedback data for students of technical teacher training program. The sampling of the research was 12 undergraduate students of Teacher Training in Electrical Engineering Department, King Mongkut's University of Technology North Bangkok. The research results were found that 1) the evaluation results from 5 experts are at a high level. 2) The learners had an average score of teaching skills of 81.88, which is higher than the specified criteria. And 3) the satisfaction assessment results of the learners are at a very satisfied level.

Online full paper: **https://bit.ly/36XEgOm**
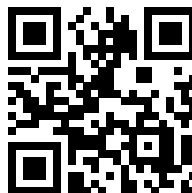
IC08_07

The Instructional Design Model to Develop an Educational Innovation and Information Technology for Industrial Education

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Rajamangala University of Technology Srivijaya, Thailand

Information and Communications Technology (ICT) have a vital role in education, especially for industrial education. ICT is a part of instructional design to create appropriate media and instruction. However, learner behavior was found by observing during their using ICT as presenting in class. Most of them choose the same format and traditional media creation, such as PowerPoint, as equal as using Canva, an online tool to create a presentation. To make learners who will become the teacher in the industrial education field have the tools and apply ICT to help in pedagogy. The application-based instructional design proposes in this research. To foster our learners to learn and direct themselves while studying with self-regulation. The objectives as follows: 1) to study concepts of the Instructional Design Model to develop an educational innovation and information technology for industrial education 2) to develop the Instructional Design Model for educational innovation and information technology in industrial education, and 3) to evaluate the Instructional Design Model for educational innovation and information technology in industrial education.

Online full paper: **https://bit.ly/36UXHHt**
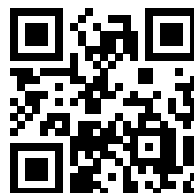
IC08_13

Online Social Network Based Blended Learning to Enhance Creative Thinking Skill for Electrical Engineering Education

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This research presents online social network based blended learning to encourage creative thinking skill for electrical engineering education that aims to 1) compare the effects of learning between pretest and posttest of the learners, 2) evaluate the creative thinking skills of the students, 3) study the satisfaction of the students who studied via the blended learning management. The Sample groups of the research were 45 the first-year students with a bachelor's degree in Teacher Training in Electrical Engineering Department, King Mongkut's University of Technology North Bangkok. Research instruments include lesson plan using on online social network-based blended learning, online instructional media, learning achievement tests, and evaluation form of creative thinking skills. The research results shown that 1) the posttest of learning achievement was significantly higher than pretest at the .05 level, 2) the learners have creative thinking skills at an average of 74.56%, and 3) the students' satisfaction with the developed learning and teaching management was at a high level (the mean equaled to 4.22).

Online full paper: **https://bit.ly/2TtggPO**

Development of Intellgent Career Prediction System for Digital Manpower

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This research is a Research and Development. The objective is to develop intelligent career prediction system for producing graduates to digital manpower. Using the Software Development Life Cycle: SDLC, research methodology is divided into 5 steps, namely, Step 1, Demand Study. (Requirement) Step 2 System Analysis Step 3 System Design Step 4 Implementation and Step 5 Testing & Evaluation Research results by experts evaluating the efficiency of the system in 5 areas, including 1) the ability to work according to the needs of those use the average level of suitability is at the highest level (Mean = 4.56, S.D. = 0.50), 2) The functionality of the system functions. The average level of suitability was the highest (Mean = 4.60, S.D. = 0.52), 3) Ease of use of the system. The average suitability level was the highest (Mean = 4.64, S.D. = 0.56), 4) the system performance average, the suitability level was the highest (Mean = 4.61, S.D. = 0.58), and 5) the data security in the system, the suitability level was the highest (Mean = 4.57, S.D. = 0.49) Overall, the level of suitability was the highest. and the results of the algorithm testing and comparing the performance of the algorithm used to intelligent career prediction for producing graduates to the digital manpower, concluded that overall performance of the system was on average at the highest level and concluded that the Random Forest technique was the highest efficiency, with accuracy 93.33%.

Online full paper: **https://bit.ly/3rwkxyo**
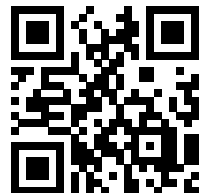
Development of Virtual Professional Training Community System to Develop Digital Teacher Competencies

Napajit Dusadee, Pallop Piriyasurawong, Prachyanun Nilsook
leelawadee27@gmail.com, palloppi@gmail.com, prachyanunn@kmutnb.ac.th

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This research aims 1) to develop a virtual professional training community system to develop digital teacher competencies, 2) to study the effects of using virtual professional training community systems to develop digital teacher competencies. The samples used in the research included 81 teachers selecting a specific sample, the results of which were 1) the development of a virtual professional training community system to develop digital teacher competencies, included 1.1 training courses, digital teacher competency development, and learning management development (Computing Science). 1.2 Digital teacher competencies development training plan and learning management development (Computing Science) 1.3 Digital Education Excellence Platform "DEEP" 1.4 digital teacher competencies assessment. 2) Results of using a virtual professional training community system to improve digital teacher competencies included 2.1 digital teacher literacy assessment of trainees. Digital teacher literacy scores after training were statistically significantly higher than before training at .01 and 70 percent higher than the threshold of 2.2 percent. Overall, digital teacher skills were high. 2.3 Evaluation of the digital teacher attributes of trained trainees using a virtual professional training model to develop the competencies of digital teachers found that overall, there were elevated levels of digital teacher attributes. Trained trainers had particularly good digital teacher attributes.

Online full paper: **https://bit.ly/3zsKhyF**

Author index

The 8th International Conference on Technical Education

"Transitioning to the New Normal in Engineering and Education"

July 8-9, 2021

at Faculty of Technical Education

King Mongkut's University of Technology North Bangkok

About ICTechEd 2021:

According to the changing of the global economy, Thailand's economy highly depends on manufacture and service industries, the Sufficiency Economy Philosophy have been and continue to be a vital element of development strategy as they underpin the promotion of moderation, reasonableness, and resilience. To promote the development of science, technology, research, and innovation, these principles have significantly contributed to fostering change and smooth the transition to the "New Normal".

The Faculty of Technical Education (FTE), King Mongkut's University of Technology North Bangkok (KMUTNB) has continuously concentrated on producing and developing qualified technical teachers in Bachelor's, Master's, and Doctoral levels while conducting and publicizing research in both technical education and engineering over 52 years. That is a consequence of the academic cooperation between the Thai Government and the Federal Republic of Germany especially in the knowledge transfer regarding the "Engineering Teacher". Until now, FTE has always encouraged instructors, students, and researchers to research vocational development for quality education, learning, and skills enhancement.

The 13th National Conference on Technical Education (NCTechEd13) and The 8th International Conference on Technical Education (ICTechEd8) will be organized under the theme of "Transitioning to the New Normal in Engineering and Education". The objective of The 8th ICTechEd is to provide an international forum for researchers, academicians as well as engineers to initiate, distribute, and exchange knowledge, new ideas, and application experiences about engineering and technical education to establish a sound foundation for future industries and capture opportunities from global trends and technology.

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- The Association of Industrial Education (AIE)

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และการประชุมวิชาการครุศาสตร์อุตสาหกรรมระดับนานาชาติ ครั้งที่ 8
(The 13th National Conference on Technical Education
and The 8th International Conference on Technical Education)

วันที่ 8-9 กรกฎาคม พ.ศ. 2564

ณ อาคาร 52 คณะครุศาสตร์อุตสาหกรรม
มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าพระนครเหนือ

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คณะกรรมการที่ปรึกษา

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4. ผู้ช่วยศาสตราจารย์ ดร.พนาฤทธิ์   เศรษฐกุล   ที่ปรึกษา
5. นายกิตติ   เจริญวิทิตกุล   ที่ปรึกษา

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13. อาจารย์ ดร.อโนมา ศิริพานิช กรรมการ
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6. ผู้ช่วยศาสตราจารย์ ดร.วรรณชัย วรรณสวัสดิ์ กรรมการ
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9. นางสาววลัยพร ยอดคำมี กรรมการและเลขานุการ

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10. นายวีระเชษฐ์   มะแช   กรรมการ
11. นางสาววลัยพร   ยอดคำมี   กรรมการ
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23. นางสาวอัญมณี   ภูชิน   กรรมการ

24. นางสาวพีรยาภรณ์   สุละพาน   กรรมการ

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คณะกรรมการฝ่ายประชาสัมพันธ์และพิธีการ

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9. นางสาวศิริพร   ยางสวย   กรรมการ

10. นางสาวกณิตา   กลนาม   กรรมการ

11. นางสาววลัยพร   ยอดคำมี   กรรมการและเลขานุการ

คณะกรรมการฝ่ายจัดประชุมวิชาการแบบออนไลน์

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คณะกรรมการผู้ดำเนินการนำเสนอบทความประจำกลุ่ม (Chair Session)

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2. รองศาสตราจารย์ ดร.สมศักดิ์   อรรคทิมากูล   รองประธานกรรมการ
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3. อาจารย์ ดร.ปิยะ   กรกชจินตนาการ   รองประธานกรรมการ
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5. ศาสตราจารย์ ดร.ดนัย   ต.รุ่งเรือง   กรรมการ
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7. รองศาสตราจารย์ ดร.พยุง   มีสัจ   กรรมการ
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9. ผู้ช่วยศาสตราจารย์ ดร.สุชัญญา   โปษยะนันทน์   กรรมการ
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11. ผู้ช่วยศาสตราจารย์ ดร.ประสิทธิ์   ประมงอุดมรัตน์   กรรมการ
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12. ผู้ช่วยศาสตราจารย์ ดร.ศักดา   กตเวทวารักษ์   กรรมการ
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13. ผู้ช่วยศาสตราจารย์ ดร.จิรพันธุ์   ศรีสมพันธุ์   กรรมการ
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14. ผู้ช่วยศาสตราจารย์ ดร.อโณทัย   สุขแสงพนมรุ้ง   กรรมการ
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คณะวิศวกรรมศาสตร์
มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา

มหาวิทยาลัยเทคโนโลยีราชมงคลพระนคร

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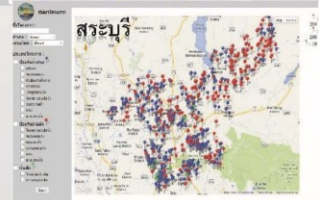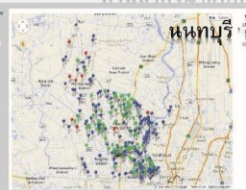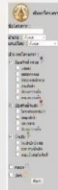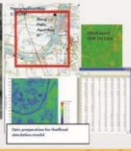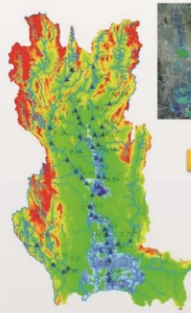ติดต่อ *090-920-8738*   *โทรศัพท์ (66) 2 555 2000-24 ต่อ 3258*   *โทรสาร (66) 2 5874167*

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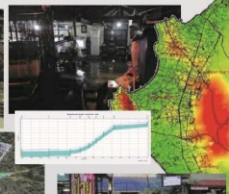
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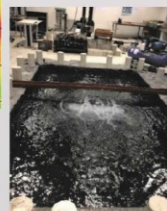
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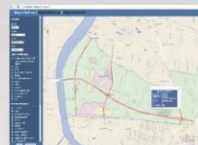และน้ำท่วมพื้นที่เมืองพัทยา

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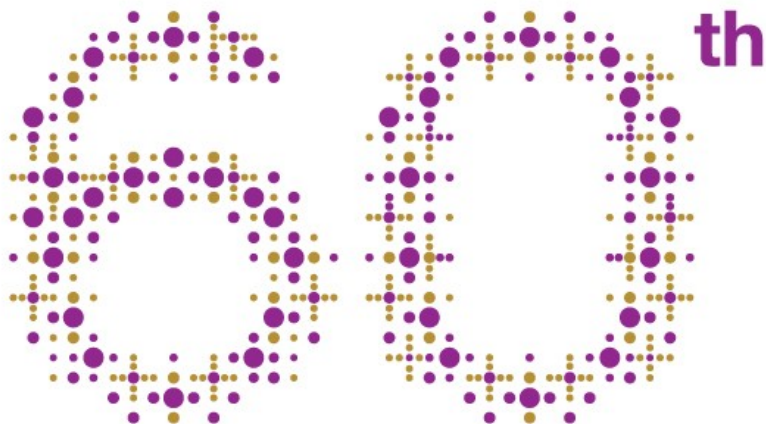
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จัดตั้งขึ้นเมื่อวันที่ 7 เมษายน 2536

โดยมีวัตถุประสงค์เพื่อ

1. ประสานสามัคคี เกื้อกูลสนับสนุนให้หมู่สมาชิกเกี่ยวกับการประกอบอาชีพที่พึงปฏิบัติต่อสังคมที่ไม่ขัดต่อศีลธรรมและกฎหมายของบ้านเมือง
2. เสริมสร้างสัมพันธ์ที่ดีระหว่างศิษย์เก่า และศิษย์ปัจจุบันของคณะครุศาสตร์อุตสาหกรรม
3. เป็นศูนย์รวมการศึกษา ค้นคว้า และเป็นที่ปรึกษาทางด้านวิชาการแก่สมาชิกและบุคคล
4. เป็นศูนย์กลางเพื่อจัดหารายได้ สำหรับบำรุงคณะครุศาสตร์อุตสาหกรรม

ทั้งนี้ ไม่ดำเนินการใดๆ ที่เกี่ยวกับการเมือง การพนัน การหาผลกำไรมาแบ่งปันตลอดจนไม่ทำให้เสื่อมเสียศีลธรรม จารีตประเพณี และวัฒนธรรมอันดีงามของชาติ

ที่ตั้งของสมาคมฯ ณ คณะครุศาสตร์อุตสาหกรรม มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าพระนครเหนือ เลขที่ 1518 ถนนประชาราษฎร์ 1 แขวงวงศ์สว่าง เขตบางซื่อ กรุงเทพมหานคร 10800

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Vision : The learning organization and mastership of engineering teacher, through a balance of morality with international invention, creativity research, and technology

Mission : 1. To produce and develop qualified technical teachers in Bachelor's, Master's and Doctoral levels.
2. To conduct and publicize research in both technical education and engineering.
3. To provide academic services i.e. consultancy, testing, survey and training.
4. Activities related to the country's art and culture should be the preservation of tradition.

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– Master of Science in Technical Education (M.S.Tech.Ed.) Program in Mechanical Engineering Education
– Doctor of Philosophy (Ph.D.) Program in Mechanical Engineering Education

Department of Teacher Training in Electrical Engineering (te.kmutnb.ac.th)
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– Bachelor of Engineering (B.Eng.) Program in Electrical Engineering and Education (5-Year Program)
– Master of Science in Technical Education (M.S.Tech.Ed.) Program in Electrical Engineering Education
– Doctor of Philosophy (Ph.D.) Program in Electrical Engineering Education
– Doctor of Philosophy (Ph.D.) Program in Electrical Energy Engineering (English Program)

Department of Teacher Training in Civil Engineering (ttc.fte.kmutnb.ac.th)
– Bachelor of Engineering (B.Eng.) Program in Civil Engineering and Education (5-Year Program)
– Master of Engineering (M.Eng.) Program in Civil Engineering and Education
– Doctor of Philosophy (Ph.D.) Program in Civil Engineering and Education

Department of Computer Education (ced.kmutnb.ac.th)
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– Master of Science in Technical Education (M.S.Tech.Ed.) Program in Computer Education
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Department of Education Technological and Information Science (met.fte.kmutnb.ac.th)
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– Master of Science (M.S.) Program in Information and Communication Technology for Education
– Doctor of Philosophy (Ph.D.) Program in Digital Technology for Technical Education
– Doctor of Philosophy (Ph.D.) Program in Information and Communication Technology for Education

Department of Technical Education Management (tem.fte.kmutnb.ac.th)
– Master of Science in Technical Education (M.S.Tech.Ed.) Program in Vocational and Technical Education Management
– Doctor of Philosophy (Ph.D.) Program in Vocational and Technical Education Management