

AMGS Cross Mentoring Research Activity 2017-2018

- Research Syllabus

I . Mentor

1. Personal Information

Name	Chairul Hudaya, Ph.D
Mobile Number	+62-81295166665
School or Institute	Universitas Indonesia
E-mail	chairul.hudaya@gmail.com or c.hudaya@eng.ui.ac.id
Website	http://www.ee.ui.ac.id/epes/emat
Major	Department of Electrical Engineering, Electric Power and Energy Materials

2. Education

Degree	Year	Name of University	Major	Degree	Nation
Bachelor's degree	2006	University of Indonesia	Department of Electrical Engineering	Bachelor of Engineering	INDONESIA
Master's degree	2009	Seoul National University	Department of Energy System Engineering	Master of Engineering	KOREA
Doctorate	2016	University of Science and Technology, Campus Korea Institute of Science and Technology (UST-KIST)	Energy and Environmental Engineering	Ph.D	KOREA
Dissertation	Interface Characteristics Control for Advanced Energy Materials				

3. Experiences

Duration	Position	Institute or University
2017 - now	Assistant Professor	Department of Electrical Engineering, Universitas Indonesia
2016	Visiting scholar	Korea Institute of Science and Technology
2009	Internship	Samsung Cheil Industries, Ltd. Korea
2007-2008	Instructor for World Culture Heritage	MIZY (Myeongdong Information Zone of Youth) Center, a center operated by the Korean National Commissions for UNESCO under the auspices of the Seoul Metropolitan Government
2008	Internship	SK Gas, Ltd, Korea
2007	Internship	Samsung Engineering and Construction, Ltd, Korea
2006 -2007	Data coordinator	Energy, Mining and Power Division, Engineering Center UI

4. Honors and Awards

Year	Title	Remarks
2017	Second Prize of Excellent Lecturer in Indonesia	Awarded by Ministry of Research, Technology and Higher Education - KEMENRISTEK DIKTI
2017	ASEAN Young Scientist and Technologist Award	ASEAN
2017	UST Overseas Honorary Ambassador for Indonesia	University of Science and Technology (UST) Korea
2017	First Prize of Excellent Lecturer in UI	Awarded by University of Indonesia
2017	First Prize of Pertamina Idegila Energy Competition	Awarded by Pertamina Idegila Energy Competition
2016	Excellent Award,	President of KIST, Korea
2016	Excellent Research Award	Mayor of Daejeon City, Korea
2015	Excellent Award in Research Paper	President of UST
2014	Overseas Training Program at Karlsruhe Institute of Technology (KIT), Germany	UST
2011	Outstanding Paper at ICAE	International Conference on Advanced Electromaterials
2011	Excellent Poster Award	President of KIST
2016	IRDA-KIST and UST Scholarship	UST-KIST

2010	Most Favorite Lecturer at Dept. of Electrical Engineering, IME	Electrical Engineering Student Association of UI
2009	The 2nd Prize of National Electrical Paper Competition	PT. PLN Persero
2009	Graduate Scholarship for Excellent Foreign Students	Seoul National University
2007	Travel Grant Award to Italia	IAEA and ICTP
1999-2002	Outstanding Performances (From 1 st Grade to 3 rd Grade)	Senior High School SMU 1 Terbanggi Besar

5. Professional Societies

- a. Member of Institute of Electrical and Electronic Engineers (IEEE)
- b. Member of Electrochemical Society

II. Syllabus

1. Course Title & Criteria

Course Title	
Criteria	<input type="checkbox"/> Biology & Applied Biology
	<input type="checkbox"/> Chemistry
	<input checked="" type="checkbox"/> Energy & Environmental Science
	<input type="checkbox"/> Integrated Science
	<input type="checkbox"/> Medicinal Science
	<input type="checkbox"/> Nano Science
	<input type="checkbox"/> Physics
	<input type="checkbox"/> Others

2. Course Objectives & Description

Lithium-ion batteries (LIB) are the basis of environmentally friendly technologies such as electric vehicles and solar power system. Many efforts have been devoted to achieve high performance LIB through novel materials showing high energy and power density, light-weight, economically inexpensive and safe. The objective of this course is to understand the technological aspects of LIB, ranging from fundamentals to applications. After taking this course, you will have a solid knowledge on LIB and are able to implement LIB for many innovative purposes.

3. Required Textbook or papers:

- a. Lithium batteries, Science and Technology, edited by Gholam-Abbas Nazri and Gianfranco Pistoia, Springer 2009.

- b. High Energy Density Lithium Batteries, edited by Katerina E. Aifantis, Stephen A. Hackney, and R. Vasant Kumar, Wiley – VCH Verlag GmbH, 2010
- c. Lithium Batteries: Research, Technology and Applications, Greger R. Dahlin and Kalle E. Strom, Nova Science Publishers, 2009

4. Final Outcome

Mid-term Report	[V] Due date: Feb 22, 2018
Final Report	[V] Due date: March 29, 2018
Research Article for APEC Youth Scientist Journal	[V] Due date: March 30, 2018

5. Schedule

Week	Date	Topics and Activities	Assignments & Other Instructions
Week 1	Jan 10, 2018	Introduction to Electrochemical Cells	
Week 2	Jan 17, 2018	Lithium Ion Batteries (LIB)	
Week 3	Jan 24, 2018	Production processes for fabrication of LIB	Homework 1
Week 4	Jan 31, 2018	Materials Characterizations 1	
Week 5	Feb 7, 2018	Materials Characterizations 2	
Week 6	Feb 14, 2018	Positive electrode materials for LIB	Homework 2
Week 7	Feb 21, 2018	Spinel Cathode and Manganese Oxide	Midterm Examination
Week 8	Feb 28, 2018	Negative electrode materials for LIB	
Week 9	March 6, 2018	Carbonaceous and graphitic materials	
Week 10	March 9, 2018	Alloys and Intermetallic Anodes	Homework 3
Week 11	March 13, 2018	Separators of LIB	
Week 12	March 16, 2018	Electrolytes of LIB	
Week 13	March 20, 2018	Applications LIB for Electric Vehicles	Homework 4
Week 14	March 23, 2018	Applications LIB for Telecommunication and Stationary Power Supply	

Week 15	March 28, 2018	Next-generation batteries	Final examination
March 30, 2018		Mentee should submit their research article to AMGS admin team	