Industry-Academia Collaboration Program for Indonesian 2-year college

School：Cheng Shiu University
Program Name：2+i Industry- Academia Collaboration Program of Mechanical Engineering for Indonesian
Field of Program：Mechanical Engineering
Project Duration：2018.08.01 ~2011.07.31
Execution Unit：
Dept. of Mechanical Engineering/Office of International Affairs
Chief Investigator：
Dept. Chair Prof. H-S Chen/ Associate Dean Prof. W-T Ko

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1. Basic Information：

Application basic information

Program Name	2+i Industry- Academia Collaboration Program of Mechanical Engineering for Indonesian		
School	Cheng Shiu University	Department	Dept. of Mechanical Engineering
Field of Program	Mechanical Engineering		
Project Duration	2018.08.01 ~2021.07.31		
The number of students/per class	40		
The number of full-time teachers	27		
Program Introduction	The goal of this special 「 2+i precision machinery program 」 focuses on training the Indonesian students with D-3 degree to earn more theoretical and practical experience through on-campus study and off-campus internship, to cultivate the students as qualified mechanical engineers and/or related system technicians ready to work, while achieving bachelor degree, which benefits to promote vocational education and industry of Indonesia and Taiwan. The curriculum is certified by IEET, and focuses primarily on precision machinery, including fundamental mechanical, manufacturing and design analysis skills, material engineering, integrated computer manufacturing, and further to CAD/CAE/CAM/CAI. This program organizes a 3-year study to finish the minimum 72 credits to full-fill the requirement of graduation, with 3-semester on-campus study and 3-semester off-campus internship. Among the 3 strategic partners, Hua Yong Machine Industry and Magnate Technology Company help to offer hand-on experience on precision-manufacturing products about auto & motor parts and aviation/aerospace components, and Jong Shyn Shipbuilding		

	Company helps in the field of integrated marine mechanical engineering. We offer full scholarship to program students to waive out the tuition & miscellaneous fee for the first year, a monthly stipend of NTD 5000 for living expense in the first semester, and free dormitory living before off-campus internship.

- Strategic Partner

Name of company	1. Hua Yong Machine Industry 2. Magnate Technology Co., Ltd. 3. Jong Shyn Shipbuilding C., Ltd.	Business Registration Number	1. 79412435 2. 86263092 3. 82050180
Scope of business	1. Hua Yong Machine Industry is the largest gear production company in Taiwan and the major provider to Bomdardier and Danfoss, mainly on precision manufacturing products of auto & motor parts , and aviation/aerospace parts as well. 2. Magnate Technology Co., Ltd. is awarded ISO 9001:2008 + AS9100C and focuses on the production of aviation/aerospace components and assembly, including landing gear, engine casing and heat exchanger, supporting Airbus, Boeing, and other major aerospace companies in the world. 3. Jong Shyn Shipbuilding Co., Ltd. has been established more than 30 years with over 500 vessels built and over 600 ships modified and maintained, and is the largest yacht professional manufacturing group in Asia, and the 5th in the whole world.		
Supports from the strategic partner	1. Offer internship-related facilities, working space, occupation, etc. 2. Coordinate with faculty members to offer courses and advise student projects. 3. Arrange students' visits to the working place. 4. Supervise interns. 5. Advise interns with studies for more advanced skills. 6. Offer reasonable stipends to program students during internship. 7. Provide internship-related essential training .		

4. School advantage area characteristics

Our school was set out as Cheng Shiu Junior College of Technology in 1965. In 1999, the school was promoted to be Cheng Shiu Institute of Technology and was further upgraded to Cheng Shiu University in 2003.

The University is located in Kaohsiung City, the southern metropolis of Taiwan. It is next to Chengcing Lake Scenic Area. It has convenient transportation, complete living functions and various industrial clusters, facilitating practical teaching and the promotion of academic-industry cooperation.

The school is positioned as a "pragmatic and innovative industrial teaching university". Its teaching and research integrates "innovation" and "pragmatism", connecting "industry" with "campus", providing the best teaching and learning environment for teachers and students. The vision of the school is to build a Create Smart University.

In 2005, the university ranked 4th among private schools in the “Accreditation of the Universities of Science and Technology” conducted by the Ministry of Education of Taiwan. In the 2010 accreditation, CSU ranked 3rd, surpassing many other national universities of science and technology.

CSU received Teaching Excellence project grants for 12 consecutive years from 2005 through the end of the project in 2017.

CSU received the title of “Leading academic-industry cooperation partner” for 12 consecutive times from 1995 to 2018. In 2012, CSU was awarded the 1st place in the industry-academia cooperation under the categories of private universities and vocational and technological universities.

In the famous international competitions, our students won 140 gold medals, 134 silver medals, 119 bronze medals and 35 special awards, and received numerous domestic and international patents on new inventions, from 2011 through 2016.

CSU has been honored as one of “the Paradigm Universities of Science and Technology” since 2013, and still dedicates to the education of innovation and

entrepreneurship to connect with all start-ups, business incubators, and accelerators in a well-established on-campus Innovation Center.

CSU has 424 full-time faculty members (about 84% for assistant professors and above), along with 600 part-time faculty members, and approximately 19,000 students, the largest school in higher vocational education systems in Taiwan. We offer practical skills-based curriculum, with 13 types of licenses and 20 technical examination venues including two grade A examination venues which are the best among the universities in Taiwan.

The Department of Mechanical Engineering aims to cultivate mechanical engineers, mechatronical engineers and related systems technicians with the skills necessary to satisfy the development trends of both domestic and global industry.

The curriculum focuses primarily on fundamental mechanical, manufacturing and design analysis skills, but also provides supplemental instruction in such fields as material engineering, integrated computer manufacturing, automated control, gas and liquid pressure control, microelectronics integration, CAD/CAM, and nano-mechanics.

Building upon this solid instructional and research foundation, the department actively participates in many academic and industrial research projects in the mechatronical field, and is the frequent organizer and host of major national and international conferences aimed at improving the quality of both the teaching methods applied and the research initiatives performed in the related field.

The major facilities within the department and institute include a scanning electron microscope lab, a micro-fabrication lab, a vibration analysis lab, a photo-mechatronics systems lab, an applied composite material lab, a sensor and signal processing lab , an automation systems lab, a micro thermal/fluidic systems lab ,a mechatronics integration lab , an Engineering Research and Technology Center, and a CAD/CAE/CAM integration center.

In the near future, a brand-new and unique on-campus “CNC Expert Incubation Center”, sponsored by MOE, will officially run in mid-July, 2018, serving as the most important training center for expertise in the field of precision-

manufacturing, to enhance regional industry-academia cooperation and to improve the production of smart machine and aviation/aerospace technology for Industry 4.0.

5. International exchange experience

Since 1985, CSU has built strong alliance relationship with 167 sister schools from 25 countries all over the world, such as the United States, Costa Rica, Russia, Japan, China, the Philippines, Thailand, Paraguay, Slovenia, Italy, Australia, India, Vietnam, Korea, Spain, New Zealand, Canada, Singapore, and so on. Among those, we have 12 partners from Indonesia, including BINUS University, Universitas Sebelas Maret, Universitas Wahid Hasyim, and Politeknik Negeri Banyuwangi, etc. Currently, in the spring semester of 2018, we have over 210 registered foreign students and 64 exchanged foreign students from 15 countries. Take BINUS University for example, they regularly sent out about 20 exchanged students to CSU for each semester. On average, we have about 70 visiting professors/scholars each year for lecture, and host 2-5 international conferences in a year, such as the joint conferences with Kansai University, Waseda University, King Mongkut's University of Technology, Peking University, and so on.

To increase CSU student mobility, we encourage students to apply for overseas exchanged program or internship, and send out about 70 students to our sister schools and enterprises in Japan, Philippine, Thailand, Singapore, and USA, each year. With the fruitful results, in 2017, CSU received the title of 「Excellent School of Enhancing Young Global Mobility」, one of the only 3 winners among all colleges and universities in Taiwan.

Meanwhile, CSU is experienced in offering special programs for foreign students. Department of Electronic Engineering and Department of Computer Science & Information Engineering offer 「Industry-Academia Collaboration Bachelor Programs for Overseas Compatriots」for years. Currently, Department of Mechanical Engineering is offering 「Industry-Academia Collaboration Bachelor Programs for International

Students – Precision Manufacturing Program 」, with 17 Indonesian students enrolled in this program. Moreover, Department of Electrical Engineering and Department of Electronic Engineering applied and have been granted to launch the similar programs in the incoming fall semester of 2018.

6. Admission planning

(1) Program objective（With anticipated effectiveness）:

The goal of this special 「 2+i precision machinery program 」 focuses on training the Indonesian students with D-3 degree to earn more theoretical and practical experience through on-campus study and off-campus internship, to cultivate the students as qualified mechanical engineers and/or related system technicians ready to work, while achieving bachelor degree or even higher graduate degree, which benefits to promote vocational education and industry of Indonesia and Taiwan.

(2) Program core capacity（With specifications）:

The curriculum offered by Department of Mechanical Engineering is certified by IEET, and aims to achieve the following 8 core competencies.

Core competence I: The ability to use mathematics, science and engineering knowledge.

Core competence II: The ability to design, execute experiments, analyze and interpret data.

Core competence III: The skills to execute engineering practices, and the ability to use modern tools.

Core competence IV: The ability to understand engineering systems, components or processes.

Core competence V: Project management, effective communication, knowledge Integration and team work development.

Core competence VI: The ability to excavate, analyze and solve problems.

Core competence VII: New technology exploring, development, and continuous

learning.

Core competence VIII: Understanding and practice of engineering ethics and social responsibility.

(3) The proposed recruitment and its plan to corporate with its Strategic Partner

We propose to recruit the Indonesian students with D-3 degree and major in mechanical engineering or related fields, endorsed by Indonesian government, to earn more theoretical and practical experience through on-campus study and off-campus internship. We plan to cultivate the students as qualified mechanical engineers and/or related system technicians ready to work, while achieving bachelor degree or even proceeding to higher graduate degree, which benefits to promote vocational education and industry of Indonesia and Taiwan. Among the 3 strategic partners, Hua Yong Machine Industry and Magnate Technology Company help to offer hand-on experience on precision- manufacturing products about auto & motor parts and aviation/aerospace components, and Jong Shyn Shipbuilding Company helps in the field of integrated marine mechanical engineering.

(4) Study years and total required credits（It should be complied with relevant requirement and school regulation）:

This program organizes a 3-year study to finish the minimum 72 credits to full-fill the requirement of graduation for bachelor degree, with 3-semester on-campus study and 3-semester off-campus internship.

(5) Admission exam and entry requirement：

The applicants must have a D-3 degree and major in mechanical engineering or related fields. CSU Admission Committee will review the applicants' status, based on their previous academic performance, language proficiency, and potential, to make the final decision of admission list. No admission exam needed.

(6) Applications：

Representatives from CSU Admission Committee will interview with applicants in Indonesia. Upon interview, the applicants have to fill out the application form and hand out some preliminary documents, including the photocopies of college diploma and transcripts, study plan, and language proficiency certificates (English or Chinese), proof of awards and certificates, if available, for further review. The accepted students have to offer the original copies of college diploma & transcripts, medical examination report, all authenticated by TECO, and admission letter for further student visa application, and upon arrival at CSU.

(7) Curriculum Planning：

(As shown in the following table)

Instructions: 1. Minimum Graduate credits are 72, including 60 credits for required courses (liberal education courses 16 credits, professional courses 26 credits, off-campus internship 18 credits) and 12 credits for elective professional courses.
2. For Off-campus internship (I), (II), (III), students serve for internship at the workplaces of strategic partners.
3.▲co-instructor

Course Attribute	Required/Elective	Academic Year I Course	Fall credit	Fall hr	Spring credit	Spring hr	Note	Required/Elective	Academic Year II Course	Fall credit	Fall hr	Spring credit	Spring hr	Note
Liberal Education	R	Chinese（A）	4	4				R	Advanced Chinese	2	2			
	R	Scientific English（A）	2	2				R	Scientific English Writing & Presentation	2	2			
	R	Chinese（B）			4	4								
	R	Scientific English（B）			2	2								
Subtotal 1			6	6	6	6		**Subtotal 1**		4	4			
Professional	R	Mechanics of Materials	3	3				R	Computer-Aided Manufacturing and Practice▲	4	4			
	R	Material Science	3	3				R	Automation Technology and Practice▲	4	4			
	R	Computer-aided Drawing and Practice▲	3	3				E	Computer-Aided Design and Practice▲	3	3			
	R	Precision Measurement and Practice▲	3	3				E	Engineering Statistics and Quality Control	3	3			
	R	Numerical Control Machining and Practice▲			3	3		E	Mechatronics Practice	3	3			
	R	Programmable Logic Controller Application and Practice▲			3	3		E	Engineering Material Testing and Practice	3	3			
	E	Computer-aided Engineering Analysis and Practice			3	3		E	Welding Engineering and Practice▲	3	3			
	E	Pneumatic Control and Practice			3	3		R	Off-campus Internship (I)			6	6	
	E	Introduction of CNC Machine Design			3	3								
	E	Microcontroller Interface Practice			3	3								
	E	Reverse Engineering and Practice			3	3								
Subtotal 2 (choose 2 from 5)			12	12	12	12		**Subtotal 2 (choose 2 from 5)**		14	14	6	6	
Total			**18**	**18**	**18**	**18**		**Total**		**18**	**18**	**6**	**6**	

Course Attribute	Required/Elective	Academic Year III Course	Fall credit	Fall hr	Spring credit	Spring hr	Note	Required/Elective	Academic Year IV Course	Fall credit	Fall hr	Spring credit	Spring hr	Note
Liberal Education														
Subtotal 1								**Subtotal**						
Professional	R	Off-campus Internship (II)	6	6										
	R	Off-campus Internship (III)			6	6								
Subtotal			6	6	6	6		**Subtotal**						
Total			**6**	**6**	**6**	**6**		**Total**						

(8) Main instruction language: Chinese, English or other (e.g. Vietnamese)
(Please specify the approach if you select more than one languages. Will there be teacher assistants or school counselors for students?)
Most of the courses will be given in both English and Chinese, with the help from our Indonesian TA.

(9) Student-teacher ratio：
Current student-teacher ratio is 21.8 at the Department of Mechanical Engineering with 27 faculty members.

(10) Tuition and miscellaneous fees, residential fees, and scholarships
We offer full scholarship to waive the tuition and miscellaneous fee (NTD56, 366 *2 semesters = 112,732) for the first year. A monthly stipend of NTD5, 000 will be granted for the first semester (5 months) to support the student's living expense (NTD25,000). We exempt dormitory fees (NTD12,500 * 3 semesters = 37,500) from the program students for free dormitory living through their on-campus study during the first 3 semesters. Students are eligible to apply for the other scholarship if applicable. For the 2nd & 3rd years, students have to pay their tuition & miscellaneous fees, following the same standard as regular Taiwanese students (NTD56, 366 for each semester).
(Total amount of scholarship estimated: NTD175, 232)

(11) Internship plan：

Curriculum Design of the Internship：

Course	**the example of internship requirement**		
Curriculum	Off-campus Internship I	Off-campus Internship II	Off-campus Internship III
	★ Practice on Professional Ethics and Disciplines ★ Factory Safety ★ Mechanical blueprint reading	★ Practice on Professional Ethics and Disciplines ★ Quality Control ★ Precision Measurement Practice ★ Automation Technology Practice	★ Practice on Professional Ethics and Disciplines ★ Computer integrated manufacturing Practice ★ Precision Machine Tool Operation Practice
Duration （Total Length: month）	6 months	6 months	6 months
Credits (Total required credits）	6 credits	6 credits	6 credits