



Advanced Manufacturing Technologies & Manufacturing Globalization in China and Taiwan

On-Campus Component:
Pre-departure Classes and orientation:
May 12, and 13, 2014

Overseas Component:
May 14 – June 4, 2014

This study abroad program is coordinated by the Northern Illinois University Study Abroad Office (SAO), in cooperation with the NIU College of Engineering and Department of Mechanical Engineering.

PROGRAM DATES: The program will officially begin on Monday, May 12, 2014 with an orientation and a series of pre-departure classes at NIU. The group will depart from O'Hare Airport for Beijing on Wednesday, May 14, 2014. The overseas component of the program will end on Wednesday, June 4, 2014 with the return of the group from Taipei to Chicago. Students will be responsible for making their own air travel arrangements in order to arrive in Beijing on Thursday, May 15, 2014 and return from Taipei on Wednesday, June 4, 2014.

PROGRAM DIRECTOR: Jenn-Terng Gau, an associate professor of Department of Mechanical Engineering of Northern Illinois University (NIU), has been conducting research and teaching in the areas of metal forming, mechanics, and design and manufacturing since he joined NIU in 2004. Before he joined NIU, he had about seven years work experience in Ford Motor Company and Harley-Davidson Motor Company in the areas of stamping and deep drawing processes. Dr. Gau has extensive collaborations with researchers and educators in China, Hong Kong, and Taiwan.



PROGRAM OVERVIEW: Today's major theme of world economics is globalization and this is especially obvious in manufacturing industry. Many manufacturing companies in the U.S. lost their competitiveness due to the rise of Chinese manufacturing industry and many large manufacturing corporations invest in China in order to remain competitive. Thus, for the U.S. manufacturing industry, it is important to understand China's and Taiwan's vital and dynamic manufacturing industry and have a global view of the world manufacturing industry and economics. This program provides students an opportunity to see and experience the massive manufacturing strength in China and Taiwan and gain a global view of world manufacturing

industry. It will also provide opportunity to interact with Chinese students and professors in the fields of manufacturing and learn Chinese culture, history and way of living. Students will benefit from these experiences and better understand the role of U.S. in the world manufacturing industry and economics. In this program we will collaborate with four host institutions in four major cities in China and Taiwan: Beijing Jiao Tong University (BJTU) and Zhejiang University of Technology (ZJUT), National Taiwan University of Science and Technology (NTUST) and National Cheng Kung University (NCKU). Each host institution will provide learning and lodging facilities and their professors will participate in teaching. In addition, we will visit Shanghai for two days during the program. The program consists of lectures and visits to research laboratories and cultural sites.

PROGRAM OBJECTIVES: The primary purpose of this program is two-fold: In the manufacturing area, students will gain a global view of manufacturing industry by seeing and experiencing the massive vitality of China's and Taiwan's manufacturing industry that is changing the landscape of the world manufacturing industry. In the area of the advanced manufacturing technologies, students will learn theories of the technologies and see many advanced manufacturing research projects in the universities, industrial parks, and MIRDC they visit. In addition, students have the opportunity to learn the culture of China that will continue to be a dominant factor in world economy. These experiences will enhance students' ability to adapt to the dynamic manufacturing industry that is under heavy influences of industry globalization.

PROGRAM SITE(S): The program will be carried out in two major cities in China: Beijing and Hangzhou and two major cities in Taiwan: Taipei and Tainan. China is a fascinating country with many cultural and historical sites and its manufacturing industry is full of vitality. Taiwan is famous in its advanced manufacturing in semiconductor and electronic products etc.



Beijing is the capital of China and has many cultural and historical sites including the Great Wall, Ming's Tombs, Palaces, Yuan-Min Garden and Forbidden City. It has several of the nation's top universities and is the main venue of the 2008 summer Olympics. Beijing Jiao Tong University (BJTU) is the host institution in Beijing. We will visit several universities and cultural sites in Beijing area. We will also visit **Suzhou**, the most beautiful garden city in China. Zhejiang University of Technology (ZJUT) is the host institution in **Hangzhou**. We will visit two industrial parks in Suzhou and Xiaoshan and the city of **Shanghai**, a modern city with numerous skyscrapers and the financial center of China.



Taipei was founded in the early 18th century and became an important center for overseas trade in the 19th century. The Qing Dynasty of China made Taipei the provincial capital of Taiwan in 1886. Now, it is the capital of Taiwan. **Tainan** is the oldest city initially established by the Dutch East India Company as a ruling and trading base called Fort Zeelandia in Taiwan. Tainan's complex history of comebacks, redefinitions and renewals inspired its popular nickname "the Phoenix City." National Taiwan University of Science and Technology and National Cheng Kung University are the host institutions in Taipei and Tainan, respectively. The group will visit several cultural sites and wafer, semiconductor and electronics manufacturers in the north part of Taiwan area and heavy machinery and metal forming industry in the south part of Taiwan area.



The transportation between these cities will be by night train with cabins and beds that is affordable and comfortable. Travel between Shanghai and Taipei will be done by air.

HIGHLIGHTS: In **Beijing**, the group will visit the Great Wall, Ming's Tombs and Summer Palace and Forbidden City, all are world class tourists' attractions. In **Suzhou**, the most beautiful garden city in China, the group will visit Suzhou gardens and Suzhou industrial park that plays vital role in China's dominance in the world manufacturing industry. In **Hangzhou**, the group will visit West Lake and Song City and Xiaoshan industrial part. In **Shanghai**, the group will visit the famous Bund, Eastern Pearl TV Tower and City Temple shopping centers. In **Taipei**, the group will visit Taipei Palace, Taipei 101, which was the highest building in the world, and Hsinzhou industrial park. The group will also visit many culture sites and an industrial park in **Tainan**.



PROGRAM AUDIENCE: This program is mainly for mechanical engineering undergraduate students. All six credit hours can be applied toward undergraduate technical electives. Students with other majors will also benefit from the many visits to companies, universities, industry parks and cultural sites.

INSTRUCTION METHOD: The program consists of lectures, homework, paper reading and discussions, quizzes, exams, project report and visits to companies and cultural sites. Most lectures will be conducted in the classrooms and laboratories provided by the host institutions. Some lectures and paper discussions will be conducted during visits to companies and cultural sites as well as during travel. Some professors of the host institutions will participate in research project presentations and demonstrations. Details of activities can be seen in the attached program calendar and course syllabi.

Students are required to submit homework and project reports and to take quizzes and exams. Project reports can be submitted by email to the instructor by the deadline. All pre- and post-program communications are conducted through email and phone.

PROGRAM ACADEMIC CREDIT: For satisfactory participation in the program, participants will receive 6 semester hours of credit in the following NIU courses.

UNDERGRADUATE CREDIT:	
MEE 498 Special Topics: Advanced Manufacturing Technologies	3 semester hours
Description: Advanced manufacturing technologies including advanced materials, advanced material removal processes, advanced metal forming processes, hybrid processes, rapid prototyping and advanced polymer processing, joining, manufacturing of microelectronics devices, computer aided manufacturing, E-based product development and manufacturing services. Prerequisite: Consent of department.	
AND	
IEET 490 Topics in Engineering and Engineering Technology: Globalization of Manufacturing Industry in China and Taiwan	3 semester hours
Description: Selected interdisciplinary topics from various engineering or engineering technology disciplines not offered in regular departmental courses. May be repeated to a maximum of 6 semester hours. Prerequisite: Consent of department.	

APPLICATION AND ADMISSION PROCEDURES: The program is open to undergraduate students who meet the NIU general admission requirements, and who are interested in Engineering and Business. Currently enrolled students must meet College of Engineering and Engineering Technology course GPA requirements.

Students must be in good academic and disciplinary standing at the time of application. Students who are on academic or disciplinary probation are not eligible to participate in study abroad programs. **Applicants must participate in the *entire* program and satisfy NIU undergraduate admission and course requirements.**

Students cannot have any encumbrances against their NIU records. Any encumbrances placed on a student's records by NIU (i.e., Undergraduate Admissions, Bursar's Office, Accounts Receivable, Registration and Records, Health Services, Parking Services, etc.) must be cleared before a student is granted admission to a study abroad program.

For undergraduate students to be admitted to the program, an applicant's official transcript must be on file in the NIU Study Abroad Office. Students who are currently enrolled at NIU, or who have previously enrolled at NIU, do not need to request an official transcript; the Study Abroad Office will make this request on behalf of the applicant. Students who want to participate in the program and earn academic credit from NIU who have **not** previously enrolled at NIU, or who are not **currently** enrolled at NIU, should ask the Registrar at their institution to forward an official transcript as soon as possible to the Study Abroad Office. (Student-issued transcripts and photocopies are not acceptable.) Questions relating to the admission requirements or transcripts should be directed to the Study Abroad Office.

APPLICATION: Click <http://niu.studioabroad.com/?go=ChinaTaiwan> or visit the NIU Study Abroad Office website at <https://niu.studioabroad.com> (and search for "(program country)" or the (program name) to begin the online application process for this program. The online process provides guidance on requesting information, advising, or applying for the program. Please note that at the time of application, applicants will be expected to submit a signature verification form and copy of their ID to the Study Abroad Office. More detailed instructions can be found on the <https://niu.studioabroad.com> website or by contacting the Study Abroad Office at (815) 753-0700 or niuabroad@niu.edu.

\$200 APPLICATION FEE/DEPOSIT: A \$200 application fee/deposit is required of all applicants. The \$200 is broken down into \$100 for the non-refundable application fee and \$100 for a program deposit. Both the application fee and the deposit will be applied to the total balance of the program cost. The \$100 deposit is refundable only if the participant withdraws prior to the withdrawal deadline indicated on the program materials or for medical reasons verified by a physician if the withdrawal takes place after the withdrawal deadline. The \$200 application fee/deposit will be charged to NIU students' NIU Bursar's account. (Checks and money orders cannot be accepted from NIU students.) Non-NIU students must submit a check or money order in the amount of \$200. More detailed instructions regarding the application fee/deposit can be found on the seminar application website.

IMPORTANT – All applications will be categorized as "Pending – No Deposit" until the \$200 application fee/deposit has been received (or, in the case of non-NIU students, once a check has been received). The Study Abroad Office will not consider or process applications without the \$200 application fee/deposit. In order to reserve your place in the program you must submit the \$200 deposit within 14 days of application. After 14 days, applications without a deposit will be inactivated.

APPLICATION DEADLINE: February 1, 2014.
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ACCOMMODATIONS AND MEALS: Participants will reside in university guest rooms in twin bedded rooms with standard bath and toilet facilities and will be provided three meals daily throughout the period of residency.

AIR TRANSPORTATION: Individuals will be responsible for making their own air travel arrangements between the U.S. and Beijing (outbound) and Taipei (return) and for purchasing their tickets from a travel agent or airline of their choice. Travel insurance is recommended. Participants should keep in mind that in order to arrive in Beijing in time for the official beginning of the program, they should plan to depart the U.S. no later than May 14, 2014.

For information regarding airfares and airlines students may wish to check-out additional airfare sites on the Internet such as STA Travel.

Important - The Study Abroad Office advises all participants that flight reservations for this program should not be booked until:

- a. After the February 14 application deadline
AND
- b. The SAO has accepted the minimum number of participants needed to operate this program.

This advisory is given so that participants do not find themselves financially responsible for airline tickets should it be necessary to cancel the program. (See section entitled, **CANCELLATION OF THE PROGRAM**)

LAND TRANSPORTATION: For program-related travel the group will travel by train and coach. This transportation is provided as part of the NIU program cost.

PASSPORT: --IMPORTANT--All participants are required to **possess** a valid passport by March 15, 2014. *Important Note: U.S. passports must be valid SIX months beyond the intended stay overseas.* Individuals who do not currently possess a valid passport should apply for one immediately upon acceptance into the program. Applicants applying after March 15 may need to request expedited services or apply in person at the Chicago Passport Agency. If applicants are not within the Chicago area, they must apply at the nearest passport agency. Information on acquiring a U.S. passport is available at the U.S. State Department's website:

http://travel.state.gov/passport/passport_1738.html. Foreign passport holders may need special visas for travel **and are responsible for obtaining all necessary visas.**



VISA: A valid passport is required by March 15, 2014 in order to obtain a visa to enter China. Individuals who do not currently possess a valid passport should apply for one immediately upon acceptance into the program. The visa forms will be provided in March 2014 for each student to complete and return to the Study Abroad Office.

PASSPORT AND ISIC PHOTOS: You may have your passport and/or ISIC photo(s) taken in the NIU Study Abroad Office. Photos are \$3.00 for the first photo and \$2.00 for each photo after that. After the first two photos, photos must be purchased in multiples of two. Photos are usually developed while you wait. Study Abroad Office hours are 8:00 a.m. – 12:00 p.m. (closed over the lunch hour) and 1:00 – 4:30 p.m.



HEALTH REQUIREMENTS/VACCINATIONS: Contact the NIU University Health Service *at least eight weeks* before your trip to allow time for immunizations to take effect. The NIU University Health Service can advise students on what immunizations are required and can administer most immunizations. Most immunizations require a fee. Consult the Travel Clinic several months before you travel. Some vaccines need to be given over a period of months, so participants in this program must **START EARLY!**

NIU MAJOR MEDICAL INSURANCE: NIU Student health insurance is required for participation in an NIU study abroad program. Participants not currently enrolled in the NIU insurance plan will be enrolled in the NIU major medical Insurance Plan (comprehensive) that has a \$250 deductible clause. Students requiring medical attention will be expected to pay any related costs and then file a claim with the NIU Student Insurance Office after returning to the States. Receipts showing payment for all medical expenses are required for reimbursement.

INTERNATIONAL STUDENT I.D. CARD: The International Student Identity Card is optional and can be purchased through the NIU Study Abroad Office.

The International Student Identity Card also includes a limited health and accident insurance policy which is only valid outside the U.S. Students will have to pay bills at the time of treatment and will be reimbursed later.



NIU PROGRAM COST: The cost covers the following:

- 1) Accommodations in university guest rooms (twin bedded rooms) and three meals per day.
- 2) Program-related land transportation in China and Taiwan.
- 3) Admission fees to cultural and historical sites visited as part of the daily schedule.
- 4) Fee for acquiring the visa to enter China.
- 5) NIU undergraduate credit.
- 7) NIU major medical insurance.

PROGRAM COST: \$4,005

All prices quoted are subject to change. The information contained in the program documents and forms is presented in good faith and is believed to be correct as of the date presented. Northern Illinois University reserves the right to amend, modify, revise, or delete any information appearing in these documents, including but not limited to the cost of the program.

Non-NIU students should consult with their home institutions regarding additional costs that may apply to study abroad. Non-NIU students are responsible for any study abroad charges imposed by their home institution.

ADDITIONAL COSTS TO PARTICIPANTS:

- Airfare
- Cost of acquiring a passport (approximately \$130, including 2 passport pictures).
- Passport size photos.
- Additional costs associated with obtaining a visa for non-U.S. passport holders.
- Immunization fees (*if immunizations are required*)
- \$40 Undergraduate application fee for non-NIU undergraduate students.
- Independent travel and visa costs associated with independent travel.
- Expenses for free-time pursuits.
- Expenses and purchases of a personal nature.

FINANCIAL AID: As a participant in a study abroad program through NIU, applicants may be eligible for: Pell Grant, SEOG, Perkins Loan, PLUS Loan, Subsidized or Unsubsidized Stafford Loan, MAP Award or your privately awarded scholarship with consent of awarding organization.

Please contact Pamela Rosenberg, International Programs Business Manager, Williston Hall 407, (815) 753-9530, prosenberg@niu.edu for more information.

WITHDRAWAL FROM THE PROGRAM: Applicants withdrawing from the program after February 1, 2014 will not be refunded the \$200 program deposit.

Applicants withdrawing from the program after this date will also be held accountable for any funds obligated to overseas vendors and agents on the applicant's behalf. This provision is in effect even if the applicant has not submitted the \$200 deposit or additional payments, and if the applicant is applying for financial aid.

If the applicant must withdraw after February 1, 2014 for medical reasons, funds obligated on their behalf to overseas vendors can only be refunded if:

- 1) The request is submitted to the Study Abroad Office in writing and accompanied by a signed statement stating that travel is not advised from a physician on the physician's letterhead; **and**
- 2) NIU is able to obtain refunds from overseas vendors and agents.

CANCELLATION OF THE PROGRAM: The Study Abroad Office reserves the right to cancel this program if the minimum required enrollment is not attained. If, prior to the commencement of the program, a U.S. State Department Travel Warning is issued for China and/or Taiwan, all applicants will be notified promptly of the warning and the possibility of cancellation of the program. In the event that the program is canceled by NIU's International Programs Division, students shall receive a full refund of all monies. If, during the course of the

program, a U.S. State Department Travel Warning is issued for China and/or Taiwan, students will be promptly notified of the warning and the advisability of canceling the program.

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**NORTHERN ILLINOIS UNIVERSITY RESERVES THE RIGHT TO ALTER
OR CANCEL THIS PROGRAM AS MAY BE DEEMED NECESSARY!**

MEE 498 Advanced Manufacturing Technologies (3 credit hours)

Catalog Description: Advanced manufacturing technologies including advanced materials, advanced material removal processes, advanced metal forming processes, hybrid processes, rapid prototyping and advanced polymer processing, joining, manufacturing of microelectronics devices, computer aided manufacturing, E-based product development and manufacturing services.

PRQ: MEE 331 or consent of department

Course Objectives: To prepare students with advanced knowledge for modern manufacturing industries and to enhance students' communication skills through team-based lab exercises.

Textbook: Manufacturing Engineering and Technology, 6th Ed., Kalpakjian and Schmid, Prentice Hall

Instructor: Jenn-Terng Gau, Ph.D., Tel: (815)753-1261, E-mail: jgau@niu.edu

Topics:

1	Advanced materials	(3 hours)
2	Advanced material removing process	(4 hours)
3	Advanced metal forming processes	(4 hours)
4	Hybrid processes	(4 hours)
5	Rapid prototyping and advanced polymer processing	(3 hours)
6	Joining	(3 hours)
7	Manufacturing of Microelectronics Devices	(3 hours)
8	Computer Aided Manufacturing	(3 hours)
9	E-Based Product development and Manufacturing Services	(3 hours)
10	Visits to companies and universities	(6 hours)
11	Term project	(3 hours)
12	Quizzes	(3 hours)
13	Final Examination	(3 hours)
Total		(45 hours)

Grading: Homework (20%), Quizzes & Exams (20%), Term Project (20%), Final Exam (40%)

Term Project Report:

The candidate titles of project will be announced in the first week. Students will choose one project title and work on it during the program. The instructor will discuss the project progress with the students periodically and provide guidance. The project report must be complied according to the format provided by the instructor. The students will be given extra days to finish the project and submit to the instructor by email by June 12, 2014.

IEET 490 – Topics in Engineering and Engineering Technology: Globalization of Manufacturing Industry in China and Taiwan (3 credit hours)

Catalog Description: Selected interdisciplinary topics from various engineering or engineering technology disciplines not offered in regular departmental courses. May be repeated to a maximum of 6 semester hours.

PRQ: Consent of department.

Instructor: Jenn-Terng Gau, Ph.D, Tel: (815)753-1261, E-mail: jgau@niu.edu

Objectives with relationship to ABET Outcomes:

1. Understand the trend of globalization of manufacturing industry. (Outcome H, J)
2. Understand manufacturing industry in China. (Outcome A, D, G, H, I, J, K)
3. Understand the impact of Chinese manufacturing on world economy. (Outcome H, J, K)
4. Understand the culture of Chinese people. (Outcomes E)
5. Understand the societal issues related to economics growth in China. (Outcome F, J)
6. Learn how to communicate with people in China. (Outcome D, G)
7. Learn how to write a technical report. (Outcome D, G, J)

Topics:

1. Introduction and program orientation	(1 hour)
2. Globalization of manufacturing industry	(3 hours)
3. Chinese engineering history (China and Taiwan)	(3 hours)
4. Societal issues of economics growth in China	(6 hours)
5. Visits to manufacturing companies and universities	(12 hours)
6. Manufacturing industry in China and Taiwan	(3 hours)
7. Paper discussions	(2 hours)
8. Visit cultural sites and companies	(12 hours)
9. Term project	(1 hour)
10. Quizzes	(2 hours)
Total	(45 hours)

Grading: Homework (20%), Quizzes (20%), Term Project (60%)

Term Project Report:

The candidate titles of project will be announced in the first week. Students will choose one project title and work on it during the program. The instructor will discuss the project progress with the students periodically and provide guidance. The project report must be complied according to the format provided by the instructor. The students will be given extra days to finish the project and submit to the instructor by email by June 12, 2014.

2014 Engineering Study Abroad Program Event Schedule (May be Modified):
MEE498 Advanced Manufacturing Technologies (3 credit hours); IEET490 Globalization of Manufacturing
Industry in China and Taiwan (3 credit hours)
Visit Major Cities: Beijing, Suzhou, Hangzhou, Shanghai, Taipei and Tainan
Tentative Schedule-Subject to Change

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Wk1		May 12 At NIU 1:30 <u>Lecture:</u> Program Orientation, Introduction to advanced manufacturing processes Gau (1)	May 13 At NIU 1:30 <u>Lecture:</u> Introduction to advanced manufacturing processes Gau(2) Quiz 1-take home	May 14 Paper Reading Depart from Chicago to Beijing 	May 15 Arrive at Beijing at 9:15PM Stay at BJUT guest house at Beijing	May 16 9:00 <u>Guest</u> <u>Lecture:</u> • Chinese culture, history & geography (1) • Manufacturing in China (2) 1:30 <u>Lecture:</u> Gau (3) Stay at BJUT guest house at Beijing	May 17 Tour: Culture (1), Visit Great Wall and Ming's Tomb Stay at BJUT guest house at Beijing
Wk2	May 18 9:00 Lecture: Gau (4) 1:30 Lecture: Gau (5) Quiz 2 Personal time Stay at BJUT guest house at Beijing	May 19 Tour: Culture (2), visit Summer Palace and Forbidden City Stay at BJUT guest house at Beijing	May 20 9:00 <u>Guest</u> <u>Lecture:</u> • Manufacturing in China (3) • Manufacturing in China (4) 1:30 Visit Tsinghua & other universities Travel to and stay at SuZhou	May 21 Visit: Manufacturing (1), visit Suzhou industry park Tour: Culture (3) Visit Suzhou gardens After dinner, travel to Hangzhou, ZJUT Stay at ZJUT hotel at Hangzhou	May 22 9:00 Group discussion with ZJUT elite class, joint project 1:30 Group discussion with ZJUT elite class, joint project Stay at ZJUT hotel at Hangzhou	May 23 9:00 Exam 1 Group discussion with ZJUT elite class, joint project 1:30 project presentation; student activities Stay at ZJUT hotel at Hangzhou	May 24 Tour: Culture (4), Visit Hangzhou, West Lake and Song City Stay at ZJUT hotel at Hangzhou
Wk3	May 25 9:00 Lecture: Gau (6) 1:30 Lecture: Gau (7) Personal time Stay at ZJUT hotel at Hangzhou	May 26 Visit: Manufacturing (2), visit Xiaoshan industry park Travel to Shanghai after dinner (2 hours) Stay at Shanghai	May 27 Tour: Culture (5), visit Shanghai Bond, Eastern Pearl Tower Stay at Shanghai	May 28 Visit World Exposition, Shopping Fly to Taipei late afternoon Stay at NTUST guest house at Taipei	May 29 9:00 <u>Guest</u> <u>Lecture:</u> • Manufacturing in Taiwan (1) • Manufacturing in Taiwan (2) 1:30 <u>Lecture:</u> Gau (8) Exam 2 Stay at NTUST guest house at Taipei	May 30 Visit: Manufacturing (3), visit HsinZhu industry park Personal time Stay at NTUST guest house at Taipei	May 31 Tour: Culture (6), visit Taipei Palace and Taipei 101, High Speed rail to Tainan after late dinner Stay at NCKU hotel at Tainan
Wk4	June 1 Tour: Culture (7) Visit Tanian culture centers, night markets Personal time Stay at NCKU hotel at Tainan	June 2 9:00 <u>Guest</u> <u>Lecture:</u> • Chinese (Taiwan) culture, history & geography; (2) • Manufacturing in Taiwan (3) 1:30 Lecture: Gau (9) Stay at NCKU hotel at Tainan	June 3 Visit: Manufacturing (4), visit KaoHsiung industry park & MIRDC High Speed rail to Taoyuan after dinner Stay at Taoyuan	June 4  Shopping Department from Taoyuan to Chicago: Arrive at Chicago at 5:00PM	June 5 Work on report Project reports will be due on 6/12		