

2024 NCKU AISSM SEMICONDUCTOR SUMMER SCHOOL



July 17-August 3, 2024

Discipline Integration for Sustainable Innovation



Academy of Innovative Semiconductor and Sustainable Manufacturing
National Cheng Kung University, Tainan, Taiwan

About the Program

The 2024 NCKU AISSM Semiconductor Summer School is a unique opportunity for students from around the world to come study at NCKU, one of the top universities in Taiwan. For 2024, the summer school will offer a special session on integrated circuit design with lab work, in addition to the introductory session on semiconductor technology and supply chain. The courses will be taught in English and confer NCKU credits.

As part of the summer school, participating students will have a one-day class at the Newcomer Training Center of TSMC in Taichung, the world's largest semiconductor foundry, where students will learn about the standard manufacturing process in the industry. Furthermore, the summer school will arrange visits to the Taiwan Semiconductor Research Institute, the national research center for semiconductor technology, where students will see the state-of-the-art facilities and equipment for semiconductor research and development.

In addition to the academic activities, the summer school will also provide cultural tours to Taipei 101, temples, historical sites, and modern art exhibitions in Taipei or Kaohsiung, the two largest cities in Taiwan.

We would like to provide this summer program to international students, where they can experience the advancements in semiconductor technology and learn about the cultural and economic developments in Taiwan. Enhancing mutual understanding and prosperity with our academic and industrial partners around the world is our pivotal dedication pursued at the Academy of Innovative Semiconductor and Sustainable Manufacturing in Tainan, Taiwan.

We welcome you to join us to experience the beauty of technology in Taiwan.

Program Organizers

- Assoc. Dean Prof. Jen-Sue Chen
- Director Prof. Lih-Yih Chiou, Program on Integrated Circuit Design
- Director Assoc. Prof. Wei-Chen Tu, Program on Semiconductor Manufacturing Technology
- Director Prof. Wen-Dung Hsu, Program on Semiconductor Packaging and Testing
- Director Prof. Chin-Shan Lue, Program on Key Materials
- Director Prof. Shih-kang Lin, Program on Smart and Sustainable Manufacturing

Program Calendar

July 17-August 3, 2024

Courses*		WED	FRI	SUN	SAT
		July 17	July 26	July 28	August 3
Session 1	A: Digital IC Design and Synthesis	9-day program			
	B: Analog IC Design and Layout	9-day program			
Session 2	C: The Essentials of Semiconductor Technology and Supply Chains			7-day program	
Whole Program**		18-day Program (16 days + 2 days for recess)			

*Course A and Course B will run in parallel. Students will choose one course to study during July 17-26 in Session 1.

** A full participation in the whole program, comprised of 2 sessions, is recommended. Students may opt for either session only, however, based on their training and availability.

Session 1: Course A

Course Title	Teaching Dates	Credits	Name of Instructor
Digital IC Design and Synthesis	July 17 – July 26	3	Prof. Lih-Yih Chiou et. al.
Description			
<p>The next-generation electronic system will have billions of transistors on a chip. To design such a complex system, designers must understand system design issues to cope with this daunting task. The course targets senior undergraduate or fresh graduate students to provide adequate background for designing a moderate-size system and emphasizes the balance between theory and hands-on. Upon completing this course, you shall have a. This course will teach you 1) VLSI system design flow, 2) primary EDA tools, and 3) moderate-size HDL coding.</p>			
Topics & Lab work			
<ol style="list-style-type: none"> 1. Verilog Baics 2. Dataflow and Behavioral Modeling 3. Behavioral Modeling 4. Combinational & Sequential Modules 5. Sequential and Parallel Blocks 6. Synthesis Basics and Examples 7. Coding Style 8. Verification and Testing 			
Remark			
<p>-Language: Taught in English -Prerequisites: 1.C or C++ Programming Skills; 2. Logic System Design; 3. Computer Organization -Appropriate level: senior undergraduate and fresh graduate students</p>			

Session 1: Course B

Course Title	Teaching Dates	Credits	Name of Instructor
Analog IC Design and Layout	July 17 – July 26	3	Prof. Shuenn-Yuh Lee et. al.
Description			
<p>Analog integrated circuits are integrated circuits that represent continuous signals in electrical form. They are circuits dealing with signals free to vary from zero to full power supply voltage. Analog integrated circuits include operational amplifiers, power management circuits, and sensors. To design such a circuit, designers must understand the device physics, transistor amplifier, differential amplifier, and operational amplifier. The course targets senior undergraduate or fresh graduate students to learn the basic design of analog integrated circuits and simulation. Upon completing this course, you shall learn the following skills: 1. Basic MOS Device Physics, 2. Single-stage amplifier, 3. Frequency response, 4. Operational amplifier.</p>			
Topics & Lab work			
<ol style="list-style-type: none"> 1. Basic MOS Device Physics and Single-Stage Amplifiers 2. Current Mirrors and Frequency Response 3. Ideal OPAMP and Finite gain and bandwidth effects 4. Basic OPAMP Architecture 5. Fully differential OPAMP and Advance Current Mirror 6. Stability and Frequency Compensation 7. Two-Stage OPAMP and Layout 			
Remark			
<p>-Tools: HSPICE, Technology Files -Language: Taught in English -Prerequisites: Electronic Circuits (intermediate level), Microelectronic Circuits -Appropriate level: senior undergraduate and fresh graduate students</p>			

Session 2: Course C

Course Title	Teaching Dates	Credits	Name of Instructor
The Essentials of Semiconductor Technology and Supply Chains	July 28- August 3	3	Prof. Jen-Sue Chen et. al.
Description			
<p>The most comprehensive selection of topics offered by the Academy of Innovative Semiconductor and Sustainable Manufacturing of NCKU. With a theme on the essentials of semiconductor technology and supply chains, a series of lectures will be delivered by both the Academy's faculty and industry experts from top-notch research centers and businesses in Taiwan for an inclusive presentation of this subject. The topics will include IC design, techniques of nanomaterials and nanocomposites, fundamentals of device physics and fabrication, advanced packaging technology with AI, IoT, and 5G application, digital twin and IC packaging, VLSI process integration, and device measurement.</p>			
Topics			
<ol style="list-style-type: none"> 1. IC Design Overview (Program on Integrated Circuit Design) 2. Advanced Semiconductor Technology (Program on Semiconductor Manufacturing Technology) 3. Latest Trend on Semiconductor Materials by Applied Materials Taiwan (Program on Semiconductor Packaging and Testing) 4. Techniques of Nanomaterials and Nanocomposites (Program on Key Materials) 5. - Circular Economy of Electronics Industry (Program on Smart and Sustainable Manufacturing) 			
Remark			
<p>-Language: Taught in English -Prerequisites: engineering backgrounds -Appropriate level: senior undergraduate and fresh graduate students</p>			

Program Dates

On-Campus Dormitory Check-in	July 16
Opening Ceremony	July 17
Session 1: <u>Digital IC Design and Synthesis</u> OR_ <u>Analog IC Design and Layout</u>	July 17 – July 26
Cultural Tour: Taipei 101 & Hsing-Tian Temple	July 20
Final Presentation-Session 1	July 26
Session 2: <u>The Essentials of Semiconductor Technology and Supply Chains</u>	July 28 – August 3
Tour: Kaohsiung Pier-2 Art Center & Hongmaokang Cultural Park	July 28
Field Study: TSMC Newcomer Training Center	July 31
Lab tour: TSRI- Heterogeneous Chip Integration Lab	July 29
Field Trip: TSRI- Heterogeneous Integration and Manufacturing Lab	August 1
Final Presentation-Session 2	August 3
On-Campus Dormitory Check-out	August 4

**Faculty-led Partnership
Application & Nomination**

Onward from December 2023 until
February 7, 2024

Partner Nomination & Student Application Deadlines	<ul style="list-style-type: none"> • Partner Nomination by January 20, 2024 • Student Application by February 7, 2024
Number of nominees from each partner university	4
Eligibility	By invitation- students recommended by professors from the partner universities that have effective agreements or are undergoing collaborative plans with NCKU AISSM
Student Level	Senior undergraduate or fresh graduate students
Financial Support	Enclosed on the call for nomination letter
Nomination by the partner universities	The contacts of partner universities will need to complete the nomination form provided on the call for nomination letter via email. The instructions for application will be provided to the nominees.

Application for Individual Students

Onward from December 2023 until April 15, 2024

Application Deadlines	<ul style="list-style-type: none"> • Early Bird Rate by March 31, 2024 • Regular Rate by April 15, 2024
Eligibility	Currently enrolled college students with engineering backgrounds
Student Level	Senior undergraduate and fresh graduate students
Financial Support	Students from the partner universities of NCKU will have a 40% discount off the regular program fees.
Application Portal	APPLICATION

Required Documents for Application

Enrollment Certificate	Scanned copy of the applicant's certificate of enrollment, supporting documents, or student ID card proving his/her status as a currently enrolled student of his/her home university.
Photo ID	Scanned copy (two sides, if any) of any of the following -Passport's ID page for students from universities in foreign countries -National ID card or other types of official photo IDs for Taiwanese students - ARC Card for overseas students studying in Taiwan
Head Shot Photo	The digital form in a picture format
Nomination letter	Required for nominees on Faculty-led Partnership

Application and Program Fees Schedule

Application Fee	USD 65 (not refundable)
Program Fees* -Regular Rate	<ul style="list-style-type: none"> • Whole program: USD 3,960 / Early Bird: USD 3,168 • One session: USD 2,160 / Early Bird: USD 1,728 <p>Early Bird Discount (20%) will be available for the applicants who finish their application by March 31, 2024.</p>
Program Fees -Special Rates for Partners for students from the partner universities of NCKU (Please refer to the inquiry webpage of NCKU OIA's partnership to see if eligible.)	<ul style="list-style-type: none"> • Whole program: USD 2,376 / Early Bird: USD 1,900 • One session: USD 1,296 / Early Bird: USD 1,037 <p>Early Bird Discount (20%) will be available for the applicants who finish their application by March 31, 2024.</p>
Refund policies	<p>Full Refund before June 5, 2024</p> <p>50% Refund before June 26, 2024</p> <p>No refund will be available after June 26, 2024.</p> <p>Bank fees for wire transfer transactions will be paid by the applicants and will be deducted</p>

	from the fees returned.
--	-------------------------

*The program fees cover meals during class time, field trips, and cultural tours. It doesn't include accommodation costs, airfare and airport taxes, local transportation costs, travel insurance, visas, meals after class, or personal expenses.

On-Campus Dormitory

<p>About NCKU On-campus Dormitory</p>	<p>NCKU has a variety of dormitories. Double rooms or bigger bedsit rooms accommodating 3 or 4 people are offered.</p> <p>Campus of the Dorm for female students SHENG-LI CAMPUS- 10 min-walk to EE department building.</p> <p>Campus of Dorm options for male students -SHENG-LI CAMPUS- 10 min-walk to EE department building. -CHING-YEH CAMPUS- 10 min-walk to EE department building. -KUANG-FU CAMPUS- 15 min-walk to EE department building.</p> <p>Participants, who sign up for the dormitory, will be assigned rooms by the Housing Service Division of NCKU based on the demands from the whole university during the summer.</p>
<p>Cost</p>	<ul style="list-style-type: none"> • Session 1 (7/16-27): NTD \$2900 (about USD\$94) • Session 2 (7/27-8/4)): NTD \$2300 (about USD\$74) • Whole Program (7/16-8/4): NTD \$4700 (about USD\$152) <p><u>Refund policy:</u> 50% can be refunded if the applicant cancels the order by 5/31, 2024. No refund can be made afterward.</p>
<p>Room Amenities</p>	<p>Tables, chairs, bed frames, wardrobes, and shared</p>

	bathrooms are provided.
Suggested personal items to bring or buy	Sleeping bag (rented service can be arranged); Pillow(s); Toiletries (shampoo, shower gel, towels, toothpaste, toothbrush, bathroom slippers for travelers)
Dormitory Album	<u>webpage</u>

Note: Off-campus housing, such as youth hostels around the NCKU campus, is available for the students to consider for their accommodation arrangement. Participants can book rooms with a hotel or hostel at their own discretions. Applicants shall indicate their accommodation plans during the application process.

Dates for Admission and Predeparture Preparation

Last day for application	<ul style="list-style-type: none"> February 7, 2024, for the faculty-led partnership nominees April 15, 2024, for the individual applicants
Application Review and Confirmation	In 5 working days after submission
Notice for Making Payment	April 22, 2024
Last day to Make Payment	April 30, 2024
Approval Announcement and Departure Preparation Notice	<p>May 15, 2024</p> <p>If a participant needs an admission letter issued by the program to apply for an entry visa of Taiwan, they shall indicate this choice on the application form.</p>
Insurance	All participants visiting from foreign countries are required to purchase a personal travel insurance plan with medical coverage for the whole period of their trip in Taiwan BEFORE they enter Taiwan. A provision of the insurance statement copy will be required upon their arrival at NCKU.
Entry Visa	<p><u>Visa-Exempt Entry</u> Participants should check if they are eligible for the visa exemption program.</p> <p><u>Visitor Visas</u> If not eligible for the visa exemption, participants shall check with <u>Taiwanese embassies</u> in their</p>

	countries on the application for a visitor visa and the time required for obtaining the visa.
Certificate of Completion & Transcript	Participants will be able to receive the certificate of completion at the final presentation. The softcopy NCKU transcript containing the course(s) taken will be provided via email by October 15, 2024. If the participants need to receive the hardcopy documents, they shall indicate this requirement on the application form and provide the mailing address to the program. For those who need credit recognition, please consult their home departments for the related policies of home universities.

Program Website

[2024 NCKU AISSM Semiconductor Summer School](#)

The website contains the latest details about the program. Please check the website regularly for any changes to the program information.

Program Contact

Ms. Kacie Liu

Email: kacieliu@gs.ncku.edu.tw / Tel: +886-6-2757575 #35000-105



國立成功大學
National Cheng Kung University

Academy of Innovative Semiconductor and Sustainable Manufacturing

National Cheng Kung University

No. 1, Daxue Road, East District, Tainan City 70101, Taiwan, ROC

TEL: 06-2757575#35000 / EMAIL: ncku_ais2m@mail.ncku.edu.tw