Course Planning

1.Graduation Credit Requirements for the Program

(1).Graduation credits: The program requires a total of 36 credits, including 6 required credits and 30 elective credits (18 of which are off-campus internships). Additionally, the program includes a non-credit master's thesis and one academic year of zero-credit Chinese language courses (6 hours per week), which are not included in the 36 credits.

Graduate students in the "International Master Program of Semiconductor Engineering" must complete at least 36 credits, including required and elective courses, and pass the exams listed in the MCU Doctoral and Master's Degree Conferral Regulations and the department's basic professional competency assessments to graduate. These 36 credits comprise 6 required credits (including four university-required Chinese language courses totaling 0 credits and two professional required courses totaling 6 credits) and 30 elective credits (of which at least 4 out of 16 professional elective courses must be completed, amounting to 12 credits or more; off-campus internships account for 18 credits).

Before submitting a thesis proposal for an oral defense, students must meet the Ming Chuan University Guidelines for Taking Academic Ethics Education Course.

(2).Master's Thesis Format:

Before graduation, master's students must meet the standards outlined in the Ming Chuan University Enforcement Rules for Chinese Proficiency Requirements. Elective courses from other master's programs must be reviewed by the department and approved with the department chair's signature.

Master's Thesis Format: Students must complete a master's thesis and pass the degree examination. The examination is conducted according to the "Ming Chuan University Doctoral and Master's Degree Conferral Regulations," and the committee must include at least one industry expert.

(3).Study Duration

In principle, the program duration is 2 years (including 1 year of on-campus courses and 1 year of off-campus internships). However, according to Chapter 7 of the university's General Provisions for Study, the duration of master's studies may range from 1 to 4 years. The study duration is calculated based on the actual time of enrollment, excluding periods of leave of absence.

2.Course Schedule

The program curriculum framework (total 36 credits) jointly developed by ASE Technology Holding Co., Ltd and Ming Chuan University Electrical Engineering Department is designed to cultivate international semiconductor talent.

Category	Credits	First Year 1st Semester	First Year 2nd Semester	Second Year 1st Semester	Second Year 2nd Semester
Required Core Courses	0	Basic Chinese (I) Basic Chinese (II)	Basic Chinese (III) Basic Chinese (IV)		
Professional Core Courses	6	Semiconductor Devices	Semiconductor Processes		
Professional Elective Courses	30	Solid-State Physics Artificial Intelligence Probability and Statistics Introduction to the Semiconductor Industry Very Large Scale Integration (VLSI) Computer-Aided Semiconductor Design Semiconductor Electronic Packaging Technology	Semiconductor Measurements NANO Electronic Devices Semiconductor Reliability Engineering Digital Integrated Circuit Design	Basic Chinese (V) Basic Chinese (VI) Integrated Circuit Testing Memory Devices ESD Testing and Protection Industry Internship (I) Industry Internship (II) Industry Internship (III)	Basic Chinese (VII) Basic Chinese (VIII) Analog Integrated Circuit Design Power Devices Silicon Photonics Device Industry Internship (IV) Industry Internship (V) Industry Internship (VI)

Note 1: Professional Course Module: This includes 2 required professional courses (6 credits) and at least 4 elective professional courses (12 credits).

Note 2: Internship Course Module (6 courses, 18 credits), primarily taken in the second year.

Note 3: Master's Thesis (0 credits), not included in the above table.

Note 4: Mandarin Course Module (0 credits): In the first year, students are required to participate in a 6-hour Mandarin tutoring course per week. Students must achieve the A2 level on the Test of Chinese as a Foreign Language (TOCFL) before being eligible for corporate internships. Additionally, the university's Mandarin Studies and Culture Center offers supplementary Mandarin courses for students to enhance their language proficiency. Master's students in Electrical Engineering who have attained the B1 level in both listening and reading in Mandarin are exempt from taking the Mandarin course.

Note 5: Students are required to write a Master’s Thesis in the second year. They

may either participate in an Industry Internship (6 courses, 18 credits) or take up to 18 elective credits as a substitute for the internship.

- Master's students must complete a minimum of 36 credits in required and elective courses, and pass the Master degree examination in order to graduate.
- Internship Course Requirements: During the study period, 1 credit of internship corresponds to no more than 80 hours. For off-campus internships, the weekly internship hours should not exceed 40 hours per week during the entire semester. (For a 9-credit internship course, 18 weeks of full-semester internship equals 720 hours). If the 18 credits of internship are not completed, students must choose 18 credits of elective professional courses as a substitute.
- During off-campus internships, companies are required to provide an internship stipend not lower than the basic wage.

Course Name	Course Outline	Teaching Hours	Required/ Elective	Credits	Semester
Basic Chinese (I)	Introduction to the basics of listening, speaking, reading, and writing in Chinese, providing simple communication skills in Chinese for non-native learners.	3	Required	0	First Year (1st Semester)
Basic Chinese (II)	Enhancing basic Chinese skills, with a focus on practical applications and communication in daily life, improving speaking and listening abilities.	3	Required	0	First Year (1st Semester)
Semiconductor Devices	Exploring semiconductor materials, their properties, and applications, introducing the operating principles of components such as transistors and diodes.	3	Required	3	First Year (1st Semester)
Solid State Physics	Studyof the fundamental physical properties of solid-state materials, including lattice structures, band theory, and electrical conductivity.	3	Elective	3	First Year (1st Semester)
Artificial Intelligence	Introduction to the fundamental theories and technologies of artificial intelligence, covering	3	Elective	3	First Year (1st Semester)

Course Name	Course Outline	Teaching Hours	Required/ Elective	Credits	Semester
	applications such as machine learning and neural networks.				
Probability and Statistics	Introduction to the fundamental concepts of probability theory and statistics, with an emphasis on their applications in data analysis and engineering.	3	Elective	3	First Year (1st Semester)
Integrated Circuit Testing	Introduction to integrated circuit (IC) testing techniques and methods that aims to ensure the performance, functionality, and reliability of the circuits.	3	Elective	3	First Year (1st Semester)
Introduction to the Semiconductor Industry	Exploring the current status, technological development, and market trends of the global semiconductor industry, and introducing the major companies involved.	3	Elective	3	First Year (1st Semester)
Very Large Scale Integration (VLSI)	Introducing the design and manufacturing process of very-large-scale integrated circuits (VLSI), and exploring their applications in modern electronic devices.	3	Elective	3	First Year (1st Semester)
Computer-Aided Semiconductor Design	Use of computer-aided design (CAD) tools for the design and simulation of semiconductor devices and circuits.	3	Elective	3	First Year (1st Semester)
Semiconductor Electronic Packaging Technology	Exploring semiconductor packaging technologies to ensure the effective operation and protection of components within electronic systems.	3	Elective	3	First Year (1st Semester)
Basic Chinese (III)	Enhancing basic Chinese language skills, with an emphasis on reading and writing, to adapt to both daily and professional applications.	3	Required	0	First Year (2nd Semester)
Basic Chinese (IV)	Enhancing overall Chinese language proficiency, including the learning of complex	3	Required	0	First Year (2nd Semester)

Course Name	Course Outline	Teaching Hours	Required/ Elective	Credits	Semester
	sentence structures and specialized vocabulary.				
Semiconductor Manufacturing Processes	Introduction to the semiconductor wafer fabrication process, including core technologies such as photolithography, etching, and thin-film deposition.	3	Required	3	First Year (2nd Semester)
Semiconductor Measurement	Study of the electrical and physical property measurement methods of semiconductor devices to ensure their functionality and performance.	3	Elective	3	First Year (2nd Semester)
Power Devices	Introduction to semiconductor power devices used in power systems, such as MOSFETs and IGBTs, and their applications.	3	Elective	3	First Year (2nd Semester)
Memory Devices	Exploring various memory technologies, such as DRAM, SRAM, and Flash, and their operating principles.	3	Elective	3	First Year (2nd Semester)
Nanoelectronic Devices	Study of nanometer-scale electronic device technologies and their applications in advanced semiconductor manufacturing.	3	Elective	3	First Year (2nd Semester)
ESD Testing and Protection	Introducing the impact of electrostatic discharge (ESD) on electronic components and the protective technologies used to mitigate it.	3	Elective	3	First Year (2nd Semester)
Semiconductor Reliability Engineering	Study of the reliability of semiconductor devices, analyzing their failure modes and lifespan during long-term operation.	3	Elective	3	First Year (2nd Semester)
Digital Integrated Circuit Design	Introducing the design process of digital integrated circuits, covering logic design, simulation, and verification techniques.	3	Elective	3	First Year (2nd Semester)

Course Name	Course Outline	Teaching Hours	Required/ Elective	Credits	Semester
Analog Integrated Circuit Design	Study of the design principles of analog integrated circuits, applied in areas such as audio and power management.	3	Elective	3	First Year (2nd Semester)
Industry Internship (I)	Participation in corporate work, learning practical skills and applying theoretical knowledge to enhance workplace experience.	3	Elective	3	Second Year (1st Semester)
Industry Internship (II)	Continuing with the corporate internship program to gain in-depth knowledge of the practical operations and processes in the professional field.	3	Elective	3	Second Year (1st Semester)
Industry Internship (III)	Enhancing professional skills and knowledge in the workplace by completing assigned tasks and projects.	3	Elective	3	Second Year (1st Semester)
Industry Internship (IV)	Deepening internship experience, expanding professional knowledge, and completing more challenging work tasks.	3	Elective	3	Second Year (2nd Semester)
Industry Internship (V)	Conducting an internship summary, analyze learning outcomes, and preparing for post-graduation career development.	3	Elective	3	Second Year (2nd Semester)
Industry Internship (VI)	Upon internship completion, submit a report summarizing the experience, and engage in knowledge sharing and professional reflection.	3	Elective	3	Second Year (2nd Semester)

3.Student Learning Outcome Assessment

The learning outcome assessment for the Semiconductor Master's Degree Program and collaboration with partner companies: To ensure that students in the "Master's program of the Department of Electrical Engineering" can comprehensively master semiconductor-related knowledge and skills, we will adopt a diversified assessment approach based on the course structure. The assessment will evaluate both the

students' academic achievements and practical abilities, while actively involving partner companies in the process. Following is the specific assessment plan:

(1).Year 1

(a) Through Coursework and Tests:

Each course will have regular assignments and tests, covering both theoretical knowledge and practical skills. The grading criteria will include the students' understanding of classroom knowledge as well as the quality and accuracy of assignments.

(b) Through Midterm and Final Exams:

Exams will be held during the semester and at the end of the semester to assess the students' grasp of the knowledge taught. The exam questions may include multiple-choice questions, short-answer questions, and application-based questions, aiming to assess students' comprehension and application abilities.

(c) Through Laboratory and Project Reports:

In laboratory courses, students will be required to complete lab reports documenting the experimental process and results, followed by analysis and discussion. Students must submit a project report at the end of the semester, demonstrating in-depth research and innovative thinking on a specific topic.

(d) Participation of Partner Companies:

Partner companies can send professional technicians to participate in student laboratory guidance and project report reviews, providing professional feedback and suggestions. Throughout the semester, regular industry lectures or academic paper seminars can be held, allowing students to learn about the latest industry trends and technological developments, as well as engage in discussions and feedback on related topics.

(2).Year 2

(a) Through Professional Internship and Practical Projects:

In the second year, students can be arranged to intern at partner companies, where they must complete assigned practical projects. Internship grades will be evaluated jointly by the company supervisor and the on-campus academic advisor, based on the student’s work performance, project completion, and practical skills.

(b) Through Master’s Thesis and Oral Defense:

Students are required to write a master’s thesis under the guidance of their advisor. The thesis topic can be chosen in alignment with the needs of the partner company. Upon completion, students must participate in an oral defense, where the defense committee may consist of the advisor, internal and external faculty, and industry experts to evaluate the student’s research results and defense performance.

(c) Through Academic and Professional Skills Competitions:
Students are encouraged to participate in academic conferences and professional skills competitions, showcasing their academic research and technical application abilities. The results of these competitions can be included in the learning outcome assessment to evaluate the student's competitiveness and innovative abilities.

(3).Participation of Partner Companies:

(a) Technical Guidance and Practical Training:
Partner companies can regularly send technical experts to the university to participate in course guidance and provide hands-on training for students. During internships, the companies will offer professional guidance to help students apply theoretical knowledge to practical operations.
(b) Special Lectures and Seminars:
Regular special lectures and seminars led by industry experts can be organized to introduce the latest technological trends and industry applications, fostering communication between students and the industry. Students will also be encouraged to participate in company-led technical seminars to enhance their practical knowledge and industry awareness.
(c) Assessment and Feedback:
Companies can participate in evaluating students' experiments, project reports, internships, and master's theses, offering professional feedback. Based on the feedback from the companies, course content and teaching methods will be adjusted to ensure that students are trained in line with industry demands.

Through these assessment methods and company participation plans, we will ensure that students receive comprehensive training in both academic and practical fields, preparing high-quality, internationally competitive talents for the semiconductor industry.

4.Faculty for the Semiconductor Courses

The faculty for the semiconductor courses in the International Semiconductor Talent Program includes professors from the Department of Electrical Engineering and supporting faculty from the Specialized Degree Program in Semiconductor Applications, such as Liu Kuo Wei, Chiu Fu-Chien, Huang Chih-Yao, Lin Yi-Hsia, and Pan Chi-Jui, and others. For detailed faculty information, please refer to:

https://reurl.cc/O5YRlv

5 Student Employment Guidance/ Specific Measures for Career Matching

(1).Employment Guidance:

To ensure that students of the "International Master Program of Semiconductor Engineering" can smoothly transition into the workforce after graduation, we will provide comprehensive employment guidance and support. The specific measures are as follows:

(a) Career Planning and Guidance:

Career Lectures: Industry experts, corporate executives, or alumni can be invited to give career lectures, helping students understand industry trends, career development paths and the skills required in the workplace.

Individual Career Counseling: Professional career consultants can be arranged for one-on-one career counseling, providing tailored career development advice based on students' personal interests, skills, and career goals.

(b) Skill Enhancement and Training:

Employment Skills Workshops: Workshops on resume writing, interview skills, workplace communication, and leadership can be offered to enhance students' competitiveness in the job market.

Professional Certification Training: Training courses for semiconductor-related professional certifications can be provided, helping students obtain industry-recognized qualifications and increasing their employment advantage.

(c) Internship Opportunities:

Corporate Internship Collaboration: Partnerships with companies such as ASE Technology Holding Co., Ltd and its industry partners can offer high-quality internship opportunities for students, allowing them to experience real work environments and gain valuable practical experience.

Internship Performance Evaluation: A comprehensive internship performance evaluation system will be established, where company supervisors and academic advisors jointly assess students' internship performance, providing feedback and suggestions for improvement to help students enhance their professional skills.

(2) Employment Matching Measures:

To strengthen the connection between students and companies, we will implement various measures to facilitate employment matching, including:

(a) University-Enterprise Cooperation and Communication:

Company Visits: Regular visits to partner companies will be organized for students, providing insights into the company's culture, operational model, and work environment, enhancing students' understanding and sense of belonging.
Campus Recruitment Activities: A campus recruitment fair will be held, inviting ASE Technology Holding Co., Ltd and its partner companies to participate, providing students with direct opportunities to meet and interview with companies.

(b) Employment Information Platforms:
University Employment Information Platform: A complete employment information platform will be set up within the university for timely release of the latest employment information, company recruitment details, and career development resources, allowing students to easily search for and apply to opportunities.
Alumni Network: A network of alumni will be built and maintained, where alumni can share employment experiences and recruitment information, expanding students' career development opportunities.

(c) Professional Employment Guidance:
University Employment Guidance Center: An employment guidance center will be established to provide professional employment advisory services, helping students develop individual career plans, and guiding them in career choices and job-searching activities.
Employment Tracking and Feedback: A graduate employment tracking system will be implemented to regularly collect and analyze graduates' employment data, understanding their employment status and market demand. Based on this feedback, teaching and employment guidance measures will be adjusted and improved.

Through the above employment guidance and matching measures, we will fully support students of the " International Master Program of Semiconductor Engineering " to successfully enter the job market and achieve career success. This will not only help alleviate the shortage of semiconductor talent but also enhance students' workplace competitiveness and the university’s reputation.

6. Tuition and fees are charged each semester according to university regulations.

Please refer to: https://control.mcu.edu.tw/en/tuitionen/