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The Abdus Salam International Centre for Theoretical Physics

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Semiconductors and Collaboration: Building Pathways for Innovation and Talent

“In the midst of chaos, there is also opportunity.” – Sun Tzu

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UniMAP Strengthening Malaysia’s Semiconductor Ecosystem Through Industry Collaboration

MIDA
MALAYSIAN INVESTMENT DEVELOPMENT AUTHORITY

MALAYSIA INVESTMENT PERFORMANCE JANUARY – JUNE 2025

RM190.3 billion
(1H 2024 : RM160.3 billion)
Total Approved Investments

44 : 56
Domestic-to-Foreign Investment Ratio

RM83.5 billion
(1H 2024 : RM85.8 billion)
Domestic Investments (DI)

RM106.8 billion
(1H 2024 : RM74.4 billion)
Foreign Investments (FI)

89,294
(1H 2024 : 86,633)
New Jobs

3,011
(1H 2024 : 3,252)
Projects

Five Major States	RM (Bil)	Manufacturing RM (Bil)	Services RM (Bil)	Primary RM (Bil)
Johor	**56.0** (1H 2024 : RM13.0 Bil)	13.1	42.9	-
Selangor	**34.7** (1H 2024 : RM35.9 Bil)	8.3	26.3	-
W.P. Kuala Lumpur	**30.1** (1H 2024 : RM36.4 Bil)	0.1	30.0	-
Pulau Pinang	**18.9** (1H 2024 : RM13.1 Bil)	12.5	6.4	-
Sabah	**11.4** (1H 2024 : RM1.9 Bil)	7.5	3.1	0.8

Top Five Foreign Investors*	RM (Bil)
Singapore	**43.4** (1H 2024 : RM7.6 Bil)
The People's Republic of China	**23.4** (1H 2024 : RM9.3 Bil)
The United States of America	**10.4** (1H 2024 : RM6.0 Bil)
British Virgin Islands (BVI)	**6.6** (1H 2024 : RM0.2 Bil)
Italy	**3.3** (1H 2024 : RM0.1 Bil)

Note*: Reporting of foreign investments is based on the ultimate source.

Services 62.3%

RM118.6 billion
(1H 2024 : RM94.4 billion)
Total Approved Investments

RM52.0 billion	RM66.6 billion	42,576	2,476
(1H 2024 : RM25.9 billion) Foreign Investments (FI)	(1H 2024 : RM68.5 billion) Domestic Investments (DI)	(1H 2024 : 52,496) New Jobs	(1H 2024 : 2,696) Projects

Manufacturing 36.0%

RM68.4 billion
(1H 2024 : RM60.2 billion)
Total Approved Investments

RM53.3 billion	RM15.1 billion	46,690	518
(1H 2024 : RM47.6 billion) Foreign Investments (FI)	(1H 2024 : RM12.6 billion) Domestic Investments (DI)	(1H 2024 : 33,910) New Jobs	(1H 2024 : 519) Projects

Primary 1.7%

RM3.3 billion
(1H 2024 : RM5.7 billion)
Total Approved Investments

RM1.5 billion	RM1.8 billion	28	17
(1H 2024 : RM0.9 billion) Foreign Investments (FI)	(1H 2024 : RM4.7 billion) Domestic Investments (DI)	(1H 2024 : 227) New Jobs	(1H 2024 : 37) Projects

Top Manufacturing Sub-Sectors

Chemicals and Chemical Products	Electrical and Electronics (E&E)	Basic Metal Products	Non-Metallic Mineral Products	Machinery & Equipment
RM15.5 Bil (1H 2024 : RM 3.1 Bil)	**RM13.1 Bil** (1H 2024 : RM36.9 Bil)	**RM9.8 Bil** (1H 2024 : RM1.2 Bil)	**RM7.1 Bil** (1H 2024 : RM3.6 Bil)	**RM5.2 Bil** (1H 2024 : RM2.9 Bil)

MIDA (Malaysian Investment Development Authority)
NCER (Northern Corridor Economic Region)

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Main Functions

MALAYSIAN INVESTMENT DEVELOPMENT AUTHORITY

Attract Investments
MIDA brings in both local and foreign companies to invest in Malaysia especially in high-tech industries like semiconductors, electronics, and EV.

Support Industry Growth
It helps companies set up factories, R&D centers, and training facilities by guiding them through approvals and incentives.

Provide Incentives
MIDA manages **tax incentives**, **grants**, and **Double Tax Deduction (DTD)** schemes to encourage industry–university collaboration.

Promote Malaysia Globally
MIDA promotes Malaysia as a top destination for manufacturing and technology investment.

Main Functions

NCER MALAYSIA

Develop Northern Economy
Plans and drives projects to grow key industries such as semiconductors, agriculture, and tourism.

Talent Development
Runs programs like **NCER Talent Enhancement Programme** to train students and graduates for high-tech jobs.

Support Entrepreneurship & Innovation
Provides funding, mentoring, and collaboration opportunities for startups and universities.

Link Industry and Academia
Works with universities like **UniMAP** to build a skilled and future-ready workforce.

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What's most important to attract investors? **Talent**

National Semiconductor Strategy (NSS)

The NSS aims to **develop world-class talent** by building **60,000 highly skilled semiconductor professionals** through education, training, and industry partnerships (Ministry of Investment, Trade and Industry [MITI], 2024)

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Talent

Problem Statement

- ✓ Malaysia is facing a **shortage of semiconductor talent** across key areas such as IC design, verification, advanced packaging, and equipment engineering.
- ✓ Many graduates have **limited practical exposure** to industrial tools, real projects, and hands-on applications.
- ✓ The semiconductor industry **needs good, industry-ready talent** to drive innovation and support the goals of the National Semiconductor Strategy (NSS).

Bachelor Programmes

Microelectronic Eng . I Electronic Eng. I Material Eng. I Manufacturing Eng. I Electronic System Eng. Tech. I Computer Eng. I Biomedical Electronic Eng. I Electronic Telecommunication Design Eng. Tech. I Mechatronic Eng. I Elektronic Network Design Eng. Tec. I Industrial Electronic Automation Tech. I Robotic And Automation Eng. Tech. I Product Design Eng. Tech. I Chemical Eng. I Industrial Chemical Process Eng. Tech.

Diploma Programmes

Electronic Eng. I Computer Eng. I Material Eng. I Mechatronic Eng. I Manufacturing Eng.

Engineering Management Programmes

Eng. Entrepreneurship I International Business

MSc Programmes

Electrical & Electronic Eng. I Embedded System Design Eng. I Microelectronic System Design Eng.

PhD Programmes

Microelectronic Eng. I Electronic Eng. I Photonic Eng. I Computer Eng. I Material Eng. I Manufacturing Eng.

DESIGN

FABRICATION

PACKAGING & TESTING

EMS & OEM

END PRODUCT

Supporting Courses/Subjects

- VLSI Design
- Digital ICDesign
- Analogue IC Design
- Embedded System Design
- System on Chip

- Microelectronic Fabrication
- Electronic Materials
- Nanoelectronic

- Reliability and Testability in IC Design
- MEMS Design & Fabrication
- Semiconductor Packaging
- Reliability & Failure Analysis

- Industrial Automation
- Advanced Manufacturing Tech
- Lean Manufacturing
- Design Manufacture

- Strategic Management
- Product Design Development
- Technology Entreneurship
- Engineering Marketing

Related Industry

Qualcomm NVIDIA NXP AMD SyMMiD OPPSTAR Micron intel BROADCOM SKYECHIP SIEMENS

SILTERRA tsmc AT&S SAMSUNG xfab intel Infineon GlobalFoundries Micron UMC

Infineon AT&S ASE GROUP ANALOG DEVICES WD Western Digital Amkor Inari AMD Texas Instruments Fuji Electric onsemi

Celestica Benchmark FOXCONN SONY PLEXUS ZANMINA JABIL TAIYO YUDEN

SIEMENS SAMSUNG SONY GM General Motors TOYOTA BMW BOSCH Continental

ATE / Supporting Equipment / Material

QRS ALTAIR ADVANTEST Plasma-Therm ASML EDWARDS TERADYNE KE KOKUSAI ELECTRIC Lam RESEARCH AELsystem 亚电科技 HORIBA VAT NIHON SUPERIOR FESTO TESSOLVE APPLIED MATERIALS ni VITrox EVG GREATECH PENTAMASTER ASM Pacific Technology ViCOCO Technologies Aemulus KEYSIGHT TECHNOLOGIES HANMI FORMFACTOR Hitachi High-Tech CISCO TEL HUAWEI

Curriculum Framework

CURRICULUM STRUCTURE
BACHELOR OF MICROELECTRONIC ENGINEERING WITH HONOURS

YEAR	YEAR 1		YEAR 2		YEAR 3			YEAR 4	
SEMESTER	I	II	III	IV	V	VI		VII	VIII
Engineering Core (104)	EMT114/3 Introduction to Electric Circuits	EMT124/3 Fundamental of Electrical Engineering	EMT282/3 Principles of Engineering Materials	EMT243/3 Introduction to IC Design	EMT353/3 Digital Integrated Circuit Design	EMT360/3 Control Engineering	EIT 302/4 Industrial Training	EMT445/2 Final year Project	EMT446/4 Final Year Project
	ECT111/3 Engineering Skills	EMT125/3 Digital Electronic Principles I	***EMT235/3 Digital Electronic Principles II	EMT245/3 Introduction to Microprocessor Design	EMT357/3 Fundamental of Microelectronic Fabrication	EMT367/3 Microelectronic Fabrication		EMT470/3 Semiconductor Packaging	EMT454/3 Nanoelectronic Engineering
	EMT181/3 Physics for Electronics	EMT115/3 Programming Language	EMT272/3 Semiconductor Fundamental	***EMT238/3 Electromagnetic Theory	EMT358/3 Communication Engineering	EMT369/3 Power Electronic		EMT475/3 Computer Organization Architecture	EMT488/3 Digital Signal Processing
	EMT116/3 Electronic Devices	EMT182/3 Analog Electronic I	EMT293/3 Signal Analysis	***EMT283/3 Analog Electronic II	EMT352/3 Advanced Devices	EMT381/4 Microelectronic Design Project		EMT478/3 Instrumentation	EMT480/3 Reliability and Failure Analysis
								EMT490/3 Micro-Electro-Mechanical Systems	
Non-Eng (19)	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT203/3 Engineering Mathematics III	EQT271/3 Engineering Statistics	EMT341/3 Management for Engineers	EMT342/2 Professional Engineers			
		UUW322/2 Thinking Skills							
University Required (16)	**UVW410/2 University Malay Language	*UVA101/2 Preparatory English	*UVW201/2 English for General Commuication	*UVW312/2 English for Technical Communication		UUW224/2 Engineering Entrepreneurship		**UUW131/2 Appreciation of Ethics and Civilization	**UUW130/2 Philosophy and Current Issues
	UZWXXX/1 Co-Curiculum	UZWXXX/1 Co-Curiculum			UUT122/2 Skills and Technology in Communication				
139	18	18	17	17	17	17	4	16	15
Total Units for Graduation 139									

Curriculum Framework

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CURRICULUM STRUCTURE FOR BACHELOR OF ELECTRONIC ENGINEERING TECHNOLOGY (ELECTRONIC SYSTEM) WITH HONOURS – UR6523007

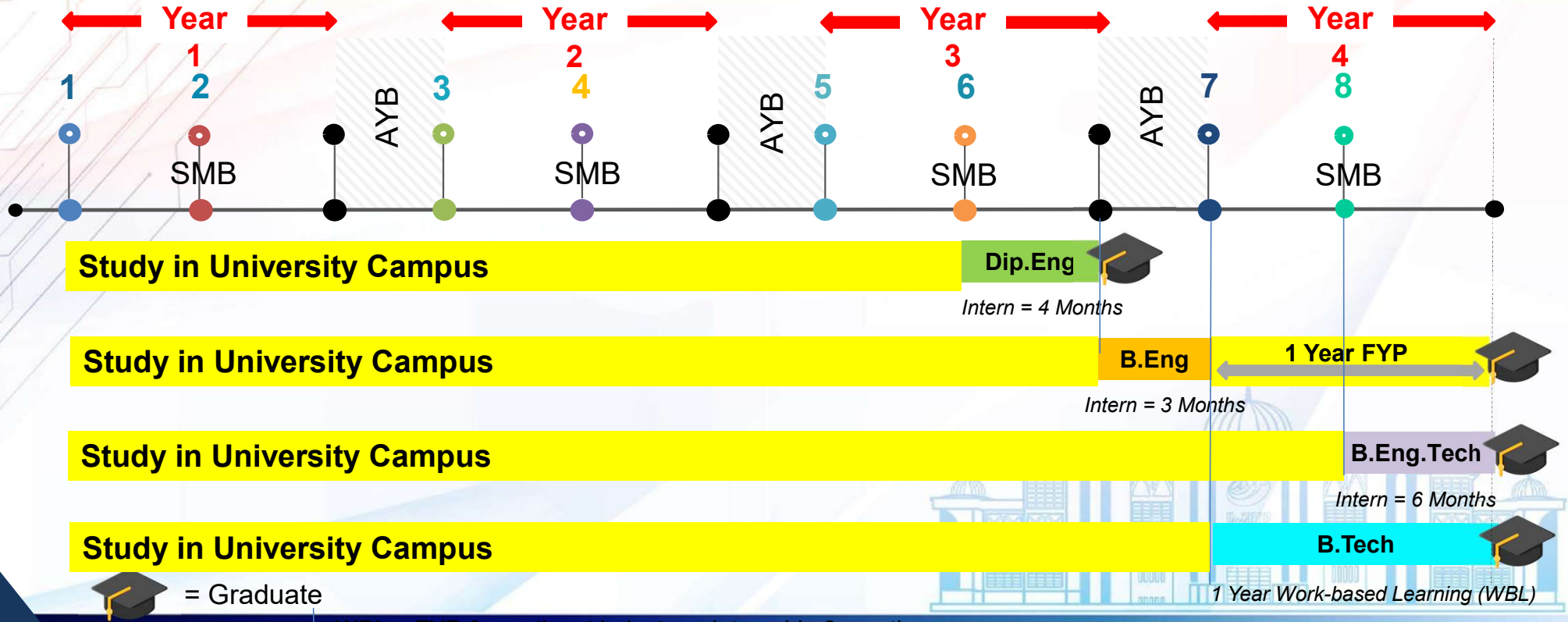
YEAR	FIRST		SECOND		THIRD		FOURTH	
SEM	I	II	III	IV	V	VI	VII	VIII
Discipline Core	NMK10103 Electric Circuits	NMK10503 Electrical Engineering Technology	NMK20103 Microprocessor	NMK20603 Computer Architecture	NMK30103 Communication Systems	NMK30004 Final Year Project I	NMK40006 Final Year Project II	NMK40412 INDUSTRIAL TRAINING
	NMK10203 Engineering Science	NMK10603 C Programming	NMK20203 Analog Electronic I	NMK21103 Electromagnetic Theory	NMK32003 Power Electronics	NMK31003 Digital Signal Processing	NMK42003 Instrumentation	
	NMK10403 Digital Electronics	NMK10702 Writing in Engineering Technology	NMK20503 Signals & Systems	NMK21303 Analog Electronic II	NMK32103 Digital Integrated Circuit Design	NMK31203 Modern Control System	Elective I	
	NMK11103 Electronic Engineering Skill	NMK10803 Digital Systems	NMK20703 Object-Oriented Programming	NMK22003 Integrated Circuit Design	NMK32203 Microcontroller	NMK31704 Design Project	Elective II	
	NMK12003 Engineering Materials					NMK32303 Verification on Chip		
Common Core	SMQ11103 Mathematics for Engineering Technology I	SMQ11203 Mathematics for Engineering Technology II	SMQ21303 Mathematics for Engineering Technology III	SMQ27303 Statistics for Engineering Technology	NMK34403 Management in Engineering Technology	NMK44403 Engineering Technologist in Society		
University Required		*SMB10102 Preparatory English	SMU22402 Engineering Entrepreneurship	SMU13002 Philosophy and Current Issues	SMB31202 English for Technical Communication			
		SMU12202 Skills & Technology in Communication	**SMB1XX02 Option Subject (Foreign Language)	SMU13102 Appreciation of Ethics and Civilizations				
		SMB41002 University Malay Language	SMB20102 English for General Communication					
	SMZXXX01 Co-Curricular Activity I	SMZXXX01 Co-Curricular Activity II						
140	19	19	19	19	17	20	15	12

Total Units for Graduation = 141

Industrial Internship Timeline & Graduation

- One Academic Semester = Study 14 weeks + Examination 3 weeks
- Semester Break (SMB) = 4 weeks
- Academic Year Break (AYB) = 10 weeks

Odd Semester (1,3,5 & 7) ≈ Sept → Feb
Even Semester (2,4,6,& 8) ≈ Mar → Aug
Convocation ≈ Nov/Dec



= Graduate

WBL = FYP 6 months at industry + Internship 6 months

Industry – Academic Engagement

Visiting Lectureship
Talk, Webinar, Training, Short Course

Joint Research, Grant & Publication

Industrial Attachment
Academic Staff (P.Eng-ship)

Industrial Internship
Undergraduate/Postgraduate/
Physical/Remote internship

Collaboration Model with Industry

Co-Supervision
Postgraduate thesis

Academic Advisor
Industrial Advisory Panel

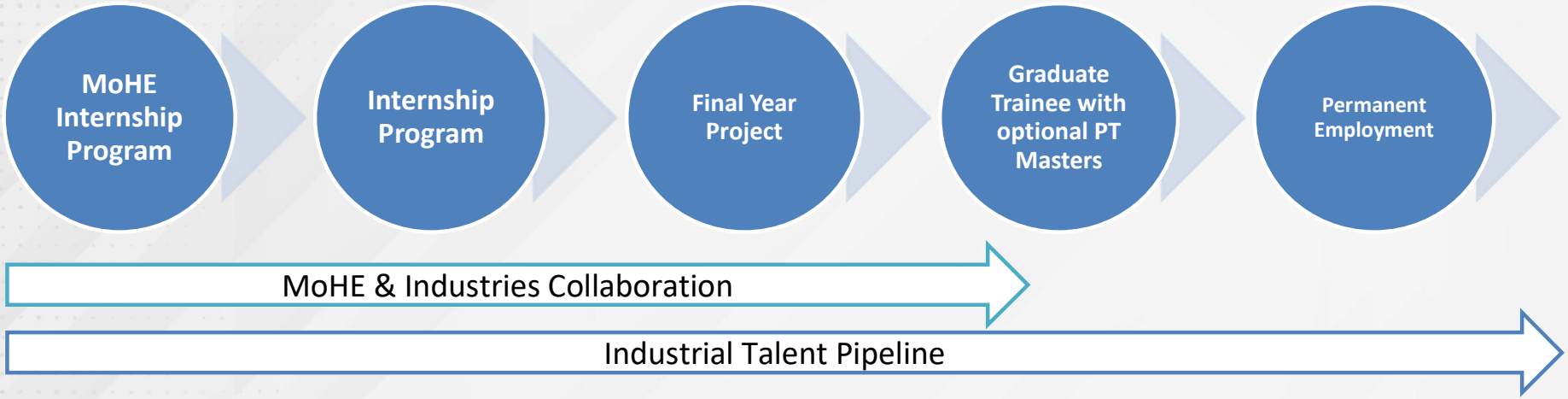
Industry Academy
Professional Certification

External Examiner
Project/Exhibition panel,
Postgraduate thesis

Problem Statement

- ✓ Malaysia is facing a **shortage of semiconductor talent** across key areas such as IC design, verification, advanced packaging, and equipment engineering.
- ✓ Many graduates have **limited practical exposure** to industrial tools, real projects, and hands-on applications.
- ✓ The semiconductor industry **needs good, industry-ready talent** to drive innovation and support the goals of the National Semiconductor Strategy (NSS).

Success Story: Structured Internship Program (Series 7: 2025)



Internship planning: July
1 weeks Orientation
3 weeks Bootcamp
5 weeks Synopsis Training
Session with department

Total Students/ lecturers trained
= 661 students
= 81 lecturers

Grants per cohort
=~RM100k/ year from MoHE
=~RM500k/year from Intel

Offer letter provide upon completion of internship

Success Story:Structured Internship Program (Series 3: 2024)

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Bootcamp

28 Feb – 20 Mac 2022

Number of students : 44
Train by Principal Engineers

Internship

8 Aug – 16 Oct. 2022
Allowances : RM 1500.00

Final Year Project

Sem 7 and Sem 8

Part time Internship = 20hrs/week
Allowances : RM 1500.00

Permanent Employment

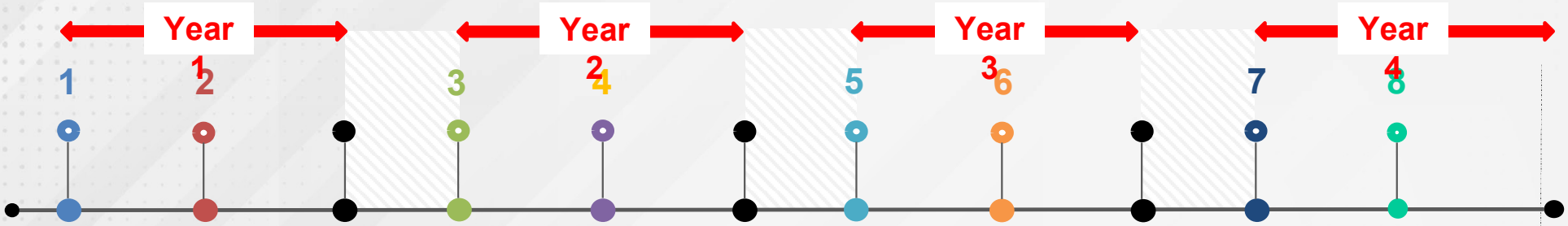
Complete study on Sep 2023

Total Students = 51 students for 3 cohorts
Amount grant = RM 785,000.00
Satellite Office at UniMAP

Condition: Must serve company for 1 year

OPPSTAR

Success Story: Structured Internship Program



Study in university campus

3 Students (oct 2023), 3 students (mac 2023)

1 Student (Aug 2024)

2 students (Aug 2018), 2 students (Aug 2019),
2 students (Aug 2020), 4 students (Aug 2021)

1 Student (Aug 2023)

18 Month Internship Program — intel

12 Month Internship Program — LOGIK HAUS

12 Month Internship Program — CYPRESS

12 Month Internship Program — FAB

MTUN STRUCTURE INTERNSHIP PROGRAM: ENG TECH PROGRAM

- The internship is conducted during the final semester of study.
- It begins on 16 February 2026 and runs for 24 weeks (6 months).The program is open to all participating universities.
- The internship content can be customized based on the company's requirements, focusing on relevant upskilling activities.
- Students do not need to return to campus after completing the internship.
- If the company wishes to offer employment, it will depend on the mutual agreement between the company and the student.

RESEARCH PROJECT ACTIVITY

The activities can vary in complexity — from **IDP (Integrated Design Project)** as a one-semester group project, to **FYP (Final Year Project)** across two semesters as individual work, and further to **MSc or PhD research projects**.

At each level, an **industry supervisor (SV)** can be included to provide technical input, while academic staff focus on ensuring academic and research value.

IDP: Engineering Technology and Engineering programs run IDP in different semesters. If Industry would like to participate, project titles can be proposed for discussion.

FYP: For Engineering students, **FYP1 will begin this coming semester**, so now is the time to gather project titles for students to choose from. Industry may share project titles together with a short abstract and objectives, which will be vetted at the faculty level.

MSc & PhD: Industry can also propose project titles, which we will advertise to students. Suitable candidates will then be identified and recommended to Industry for selection.

HOW TO MAKE IT INTERESTING

Students today are more selective. They already understand which industries offer **better allowances and benefits**, especially those involving **design, R&D, and high-tech innovation**.

The most effective way to attract them is to offer a competitive internship allowance. Companies may also consider bonding outstanding interns for a year to ensure talent retention after graduation.

Beyond financial rewards, students are also drawn to structured training programs, clear career pathways, international exposure, and employee benefits that position the company as an employer of choice.

As of now, these are the **proposed collaboration items between the company and the university**. Both parties may continue to **explore additional initiatives or joint programs** in the future, provided they offer **mutual benefits and added value** to both sides.

Takeaway Message – Semiconductor & Talent

Understand the Problem Statement
Recognize the real challenges in building a strong semiconductor talent pipeline.

Understand Industry Needs
Know what the industry truly demands, from IC design to advanced packaging skills.

Understand Our Capabilities
Identify what universities and training institutions can offer, and where we can strengthen.

Be Creative in Solutions
Design innovative talent programs that connect education, research, and real industry practice.

International Conference on Advances in Electrical, Electronic & System Engineering (ICAEESE 2026)

Intelligence for Science At The Edge

Dates:
14 – 16 September 2026

Venue:
Penang, Malaysia

TRACKS

1. Applied Electronics and Systems Engineering
2. Micro and Nano Electronics
3. Communications, Computer Engineering and Informatics
4. Information Processing and Automation
5. Power and Energy
6. Advanced Reconfigurable Instrumentation for Scientific Applications
7. Intelligence for Science At The Edge

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THANK YOU