

Welcome New Students!

Semester 1, 2026/2027

Master of Applied Sciences (Nanotechnology)

Assoc. Prof. Dr. Ong Boon Hoong
Programme Coordinator

Home of the Bright, Land of the Brave
Di Sini Bermulanya Pintar, Tanah Tumpahnya Berani

INTRODUCTION

The **Master of Applied Sciences (Nanotechnology)** program aims to provide candidates with **in-depth knowledge and skills** required in the field of **nanotechnology** in line with current developments.

WHY Master of Applied Sciences (Nanotechnology)?

Nanotechnology Market Size to Surpass US\$ 288.71 Bn by 2030

According to Precedence Research, the global nanotechnology market size is projected to surpass around US\$ 288.71 billion by 2030 and expanding growth at a CAGR of 14.5% from 2022 to 2030.

April 15, 2022 11:45 ET | Source: [Precedence Research](#)

Potential Careers

- Scientist
- Technologist
- R&D engineer
- Industry expert and consultant
- Startup founder
- Chief Technology Officer
- Nanoscience and nanotechnology educator
- Specialist at industry and governmental agencies

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1 - Graduates who demonstrate high technical competency and leadership in the fields of nanoscience and nanotechnology.

PEO2 - Graduates who demonstrate commitment towards sustainable development using nanoscience and nanotechnology for the betterment of society.

PEO3 - Graduates who demonstrate commitment to continuous learning in the ever-evolving fields of nanoscience and nanotechnology.

MASTER OF ADVANCED STUDIES (MAS)

- Study mode: **Mixed Mode**

Method	Minimum Duration	Maximum Duration
Full-time	(3 semester)	(8 semester)
Part-time	(4 semester)	(12 semester)

Total credit hour: **42 hours**

Core Courses	Elective Courses
6 credit hours	6 credit hours
Dissertation	
P1 – 12 credit hours P2 – 18 credit hours	

THE CORE SUBJECTS

Nanotechnology

Research
Methodology

THE CORE SUBJECTS

- HOB7001 RESEARCH METHODOLOGY
 - *This course focuses on establishing or advancing their understanding of research through critical exploration of research language, ethics, and approaches.*
 - *The course introduces the language of research, ethical principles and challenges, and the elements of the research process within quantitative, qualitative, and mixed methods approaches.*
 - *Students will use these theoretical underpinnings to begin to critically review literature relevant to the nanotechnology field and determine how research findings are useful.*

THE CORE SUBJECTS

- **HOB7003 NANOTECHNOLOGY**
 - *The focus of this course is to equip students with the fundamental and applied perspectives on nanotechnology.*
 - *This will promote students to deepen their understanding of the advantages and disadvantages of nanotechnology.*
 - *This course also aims to enable students to evaluate and adapt new and emerging nanotechnologies in designing solutions for current sustainable development goals (SDG).*
 - *Opportunities and entrepreneurship in nanotechnology will be explored.*

THE ELECTIVE SUBJECTS

Design, Synthesis
and Fabrication

Characterization
Techniques

Nanobiotechnology

Nanomedicine

Nanosafety and
Health

Nanoelectronics

Environmental
Nanobiotechnology

Nanobiotechnology
in Food and
Agriculture

* Select 2 only

THE DISSERTATION

Dissertation

- Industry-based research
- Using nanotechnology as solution
- Supervised by award-winning academic staff
- Access to the state-of-the-art research facilities
- In line with national policies and agenda

NANOCAT RESEARCH CENTRE

<https://nanocat.um.edu.my>

ABOUT NANOCAT

NANOCAT (Nanotechnology and Catalysis Research centre) is a pTJ incorporated by UM in 2012, a UMCoE. Its mission is to be a world leader in "catalysis and nanotechnology" coining sustainability and green technology. NANOCAT research thrust is deploying catalysis to support energy, chemical synthesis, environment pollution and global warming mitigation as well as designing smart materials as catalyst, sensor, nanocoating, and nanocomposite.

NANOCAT was given a status of HICoE Potential in 2013, in catalysis. The Centre has strived to attain a national status for HICoE (MOHE) as well as NanoCentre (NNC, MOSTI) with strong support and commitment from Universiti Malaya. In the last 4 years, 2016 to 2020, it witnessed a pronounced explosion in its productivity in all aspects.

NANOCAT PRODUCT

1. Highly Concentrated Graphene Oxide
2. Highly Dispersed Graphene Oxide Solution
3. Gel-like Graphene Oxide
4. Crude Graphene Oxide
5. Highly Stabilized Graphene Oxide
6. Graphene Powder
7. Graphene Oxide Flakes
8. Spongy-like Graphene Oxide
9. Flower-like ZnO/Graphene Nanocomposites
10. Rod-like ZnO/graphene nanocomposites
11. NanoCAT™IronAgro
12. NanoCAT™IronMedic
13. NanoCAT™Ironcoat



NANOCAT
NANOTECHNOLOGY AND CATALYSIS RESEARCH CENTRE

TECHNICAL SERVICES

1. Scanning Electron Microscope (SEM)
2. Raman Spectroscopy (RAMAN)
3. Elemental Analyser (CHNOS)
4. Fourier Transform Infra red (Ex situ-FTIR)
5. Fourier Transform Infra red (In situFTIR)
6. Differential Scanning Calorimetry (DSC)
7. Differential Scanning Calorimetry (In situ-DSC)
8. Zeta Potential (ZP)
9. Particle Size Distribution (PSD)
10. Thermogravimetry Analysis (TGA)
11. Thermogravimetry Mass Spectroscopy (TG-MS)
12. UV-Vis Spectroscopy (UV-VIS)
13. Vibration Sample Magnometer (VSM)
14. Hall Effect - Ball milling
15. X-Ray Fluorescence (XRF)
16. X-Ray Diffraction (Ex situ-XRD)
17. X-Ray Diffraction (In situ-XRD)
18. Karl Fischer Coulometer (KF)
19. Freeze Dryer
20. Autoclave 200 ml HS/SS
21. Density Meter
22. Selective Oxidation Fixed-bed Reactor (SELOX)
23. Precipitation Reactor (Lab Max)
24. Trickle Flow Reactor (TFR)
25. High Performance Liquid Chromatography (HPLC)
26. Gas Chromatography (TCD-FID)
27. Gas Chromatography (GC-MS)
28. Temperature Programmed Desorption, Reduction, and Oxidation (TPDRO)
29. Surface Area Analyser (BET Single Port)
30. Tensiometer (Surface Tension)
31. Fixed-bed Microreactor (atmospheric pressure).
32. Gel Permeation Chromatography (GPC)
33. Ion Chromatography (IC)
34. Nano Transition Metal Oxide Production Plan



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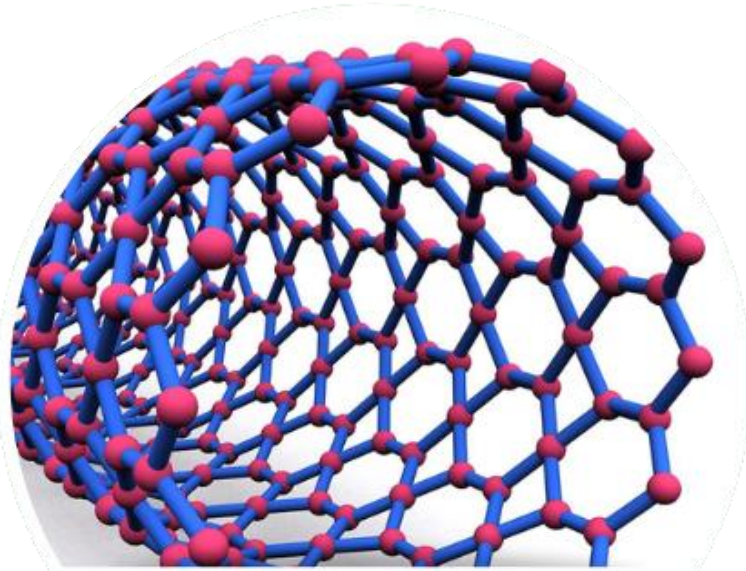


Nanotechnology and Catalysis Reserach Centre



nanocat.um

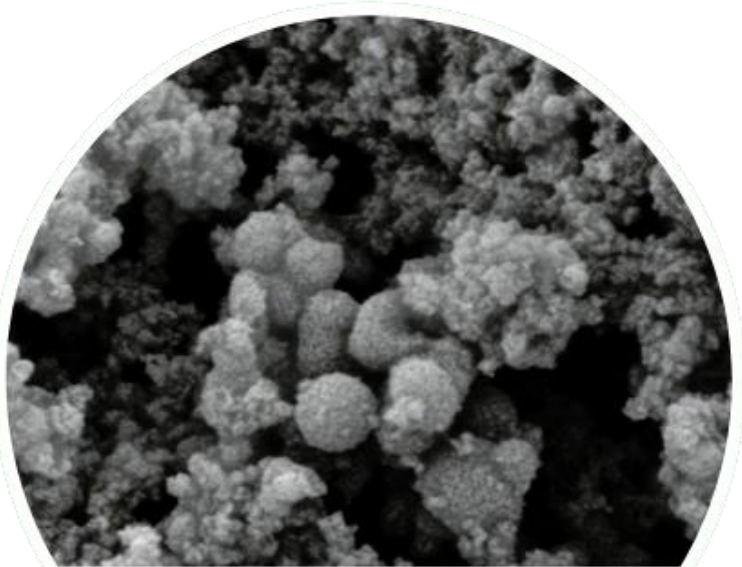
THE ELECTIVE SUBJECTS



**DESIGN, SYNTHESIS
AND FABRICATION**

The course covers the design, synthesis and control of various materials synthesis at nanometer scale. It includes strategies for develop and synthesis of nanomaterials, surface engineering of various nanoparticle-based Nano systems for different application, toxicity aspects of nanomaterials and the challenges in translation research of hybrid nanomaterials. In addition, an overview of bottom-up and top-down methods used to design better nanomaterials, Nano devices and Nano machines by controlling the positions of the atoms, molecules, and molecular clusters in solution/solid state/substrate are precisely described based on the requirements. Synthesis and fabrication of different functional nanomaterials are presented with clear illustrations. The outcome of research finding provides versatile ideology to the researchers to enable the synthesis of nanomaterials in different shapes and sizes to meet the industrial requirements

THE ELECTIVE SUBJECTS



**CHARACTERIZATION
TECHNIQUES**

This course includes an introduction to nanomaterials characterization; the essential elements of the physical basis for x-ray and electron diffraction; imaging, optical and electron-optical microscopies - imaging at the macroscale to the nanoscale; Micro- and nano-analytical techniques; scanning probe techniques; Spectroscopies - techniques, with emphasis on surface and film analysis.

THE ELECTIVE SUBJECTS

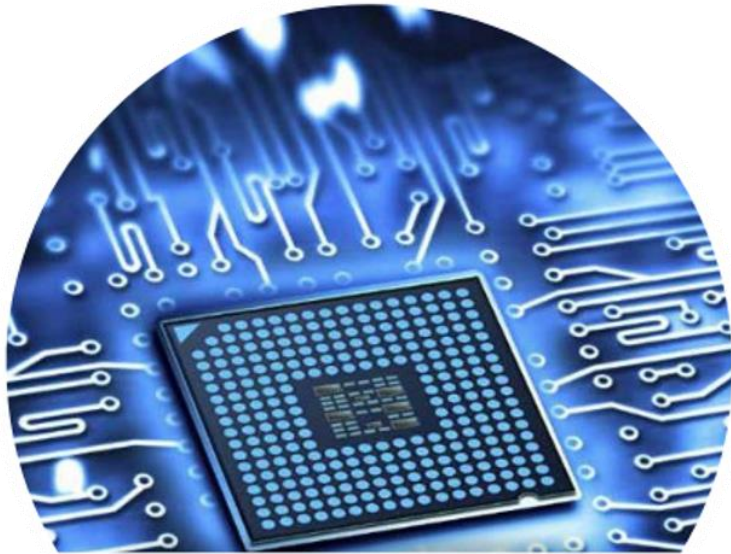


NANOSAFETY AND HEALTH

This course is based on the best available emerging evidence on nanomaterial risks and internationally recognized best practice, (ISO, OECD, OSHA).

This course includes an awareness level course designed to bring students up to speed on the emerging risk issues and how to deal with them and a hands-on practical course to equip students with the necessary skills and knowledge to handle nanomaterials in a laboratory setting. This course also develops and runs bespoke courses tailored to the particular industry or application.

THE ELECTIVE SUBJECTS

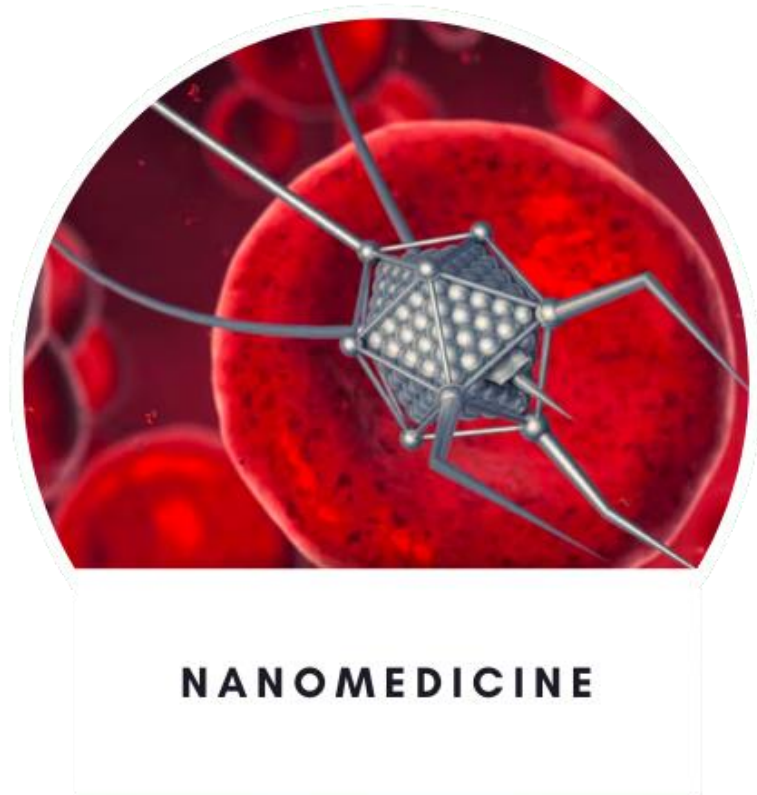


NANOELECTRONICS

The focus of this course is to equip students with the fundamental and applied perspectives on nanoelectronics. This will promote students to deepen their understanding of the current development and progress of nanoelectronics.

This course also aims to enable students to evaluate and adapt new nanomaterials in nanoelectronics applications.

THE ELECTIVE SUBJECTS



The focus of this course is to equip students with the theoretical, practical, and critical thinking perspectives on nanomedicine, particularly in the drug delivery system and various disease models. This will promote students to deepen their understanding of technology and application of nanomedicine. This course also aims to enable students to evaluate and adapt new and emerging technologies in designing nanomedicine for effective treatment.

THE ELECTIVE SUBJECTS



NANOBIOTECHNOLOGY

This course will cover the broader aspects of bio-nanotechnology and its application in the biological System. It will provide knowledge about the Biologically inspired nanostructures – introduction to biomimetics and industrial applications of biologically inspired nanostructures and materials. This will provide an introduction to cell biology and bio-nanotechnology. The course will also provide technical knowledge about applied genomics and proteomics.

THE ELECTIVE SUBJECTS



This course will cover the broader aspects of bio-nanotechnology and its impact on the environmental system. It will provide necessary information for mapping and monitoring the environmental pollutants. The course will provide information on exposure to nanomaterials resulting from medical, occupational, environmental, and accidental release. Practical phase knowledge will be provided on prediction of biological properties of nanomaterials through the toxicological assessment, fate and risk of nanomaterials usage. The regulatory laws will be discussed for safe synthesis, handling, storage and disposal of nanoparticles in the environment.

THE ELECTIVE SUBJECTS



**NANOBIOTECHNOLOGY
IN FOOD AND
AGRICULTURE**

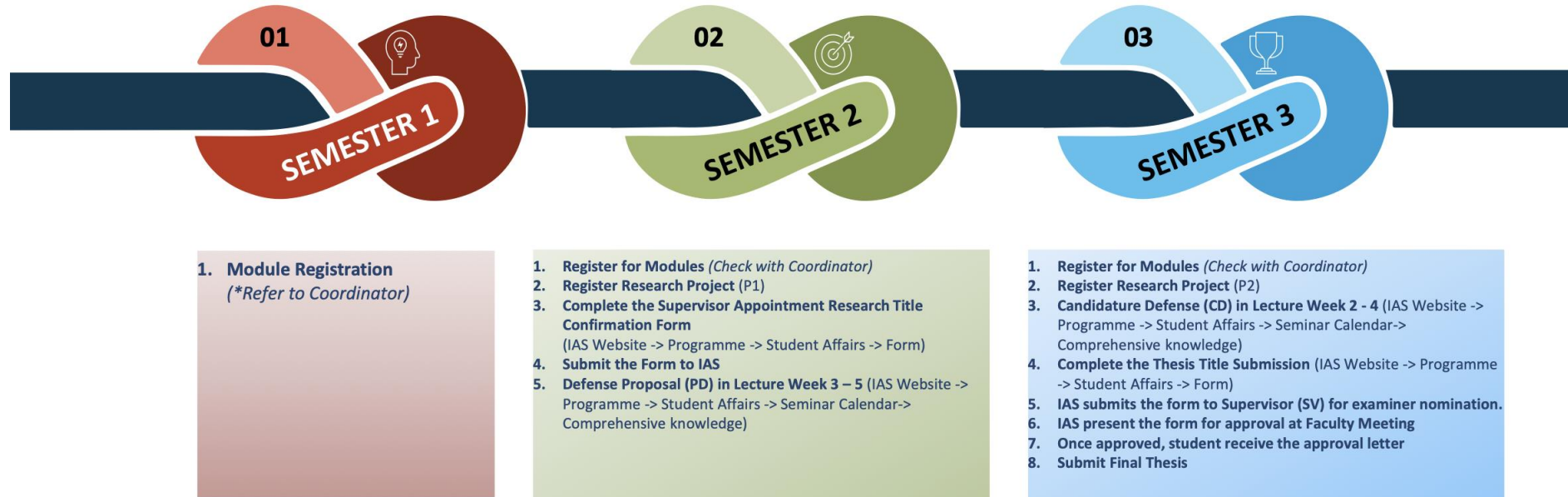
The course covers overview of the current state of this highly relevant topic, such as opportunities and challenges of nanotechnology in the agriculture and food sector, highlighting the scientific, technical, regulatory, safety, and societal impacts towards nanomaterials in food and agriculture sector. Furthermore, perspectives for the future, and provide insights into ways of assuring safety to obtain confidence for the consumer, as well as an overview of the innovations and applications.

STUDY PLAN



INSTITUT PENGAJIAN TERMAJU
Institute for Advanced Studies

MASTER OF APPLIED SCIENCES (NANOTECHNOLOGY)



(updated 12.3.25 -NHS)

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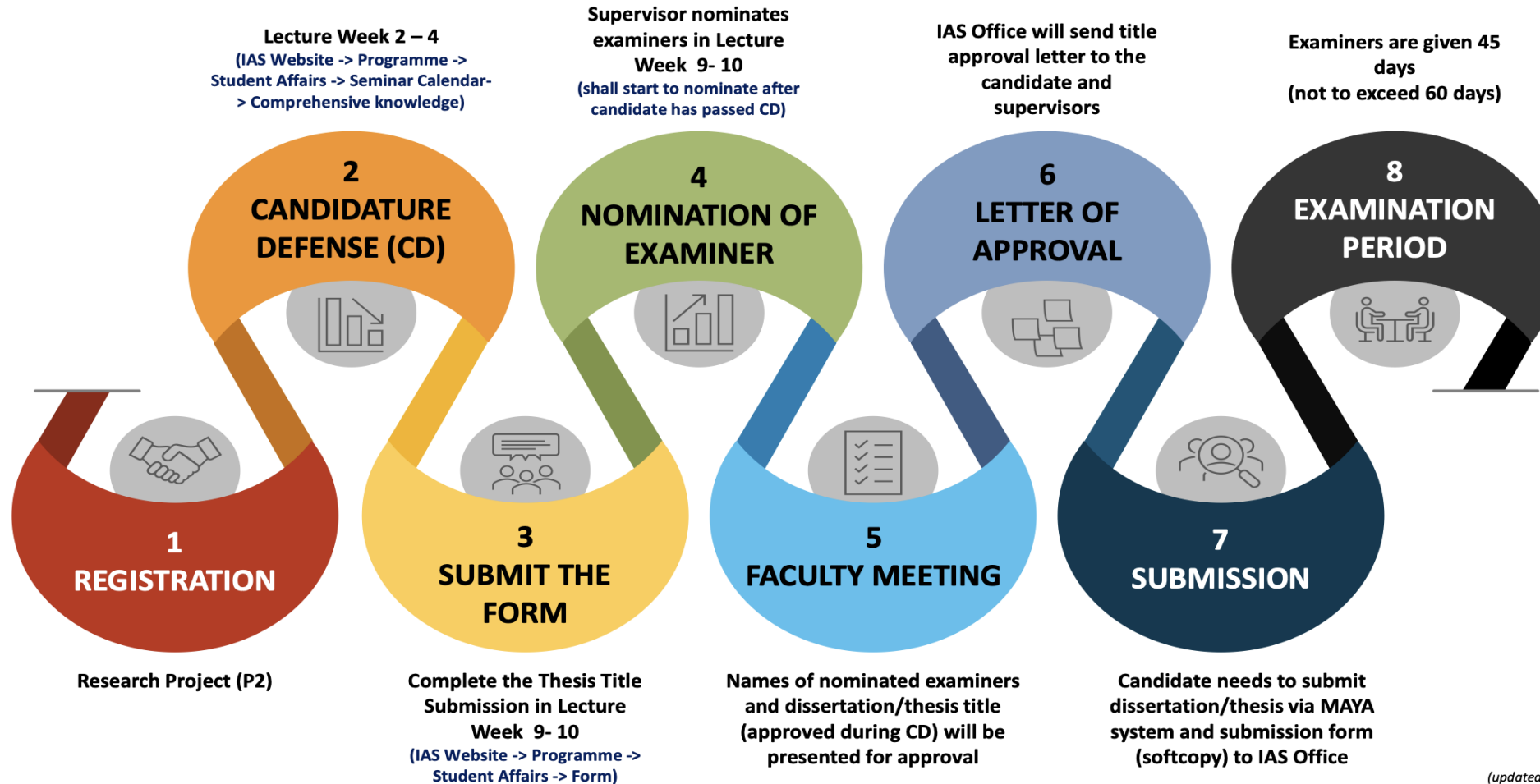


MASTER OF APPLIED SCIENCES (NANOTECHNOLOGY) SEMESTER 2



(updated 12.3.25 -NHS)

MASTER OF APPLIED SCIENCES (NANOTECHNOLOGY) SEMESTER 3



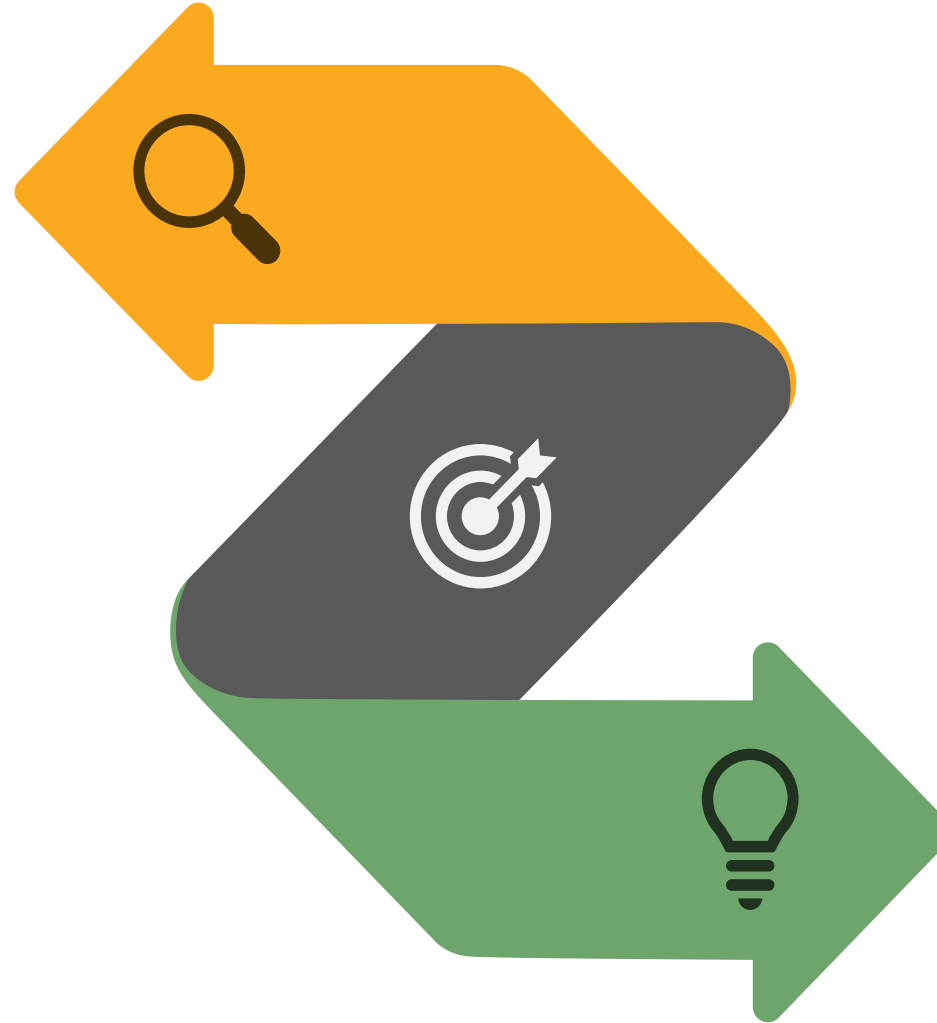
TIME TABLE SEM I 2026/2027

NO	COURSE NAME/ COURSE CODE	CREDIT	DAY/ TIME	VENUE	LECTURER
MASTER OF APPLIED SCIENCES (NANOTECHNOLOGY)					
1	RESEARCH METHODOLOGY (HOB7001)	3	SATURDAY 1 <u>PM</u> - 4 PM	AKASIA ROOM	(1) DR. MARLINDA BINTI AB <u>RAHMAN</u> (C) (2) ASSOC. PROF. DR. SURESH SAGADEVAN (3) ASSOC PROF DR LEE HWEI VOON
2	NANOTECHNOLOGY (HOB7003)	3	SATURDAY 4 <u>PM</u> - 7 PM	AKASIA ROOM	(1) ASSOC. PROF. DR. ONG BOON HOONG (C) (2) DR. NOR ALIYA BINTI HAMIZI (3) DR. YASMIN BINTI ABDUL WAHAB
3	DESIGN, SYNTHESIS AND FABRICATION (HOB7004)	3	SATURDAY 7 <u>PM</u> - 10 PM	AKASIA ROOM	(1) ASSOC. PROF. DR. NURHIDAYATULLAILI BINTI MUHD JULKAPLI (C) (2) PROF. IR. DR. LAI CHIN WEI
4	NANOSAFETY AND HEALTH (HOB7006)	3	SATURDAY 7 <u>PM</u> - 10 PM	JASMINE ROOM	(1) PROF. DR. JUAN JOON CHING (C) (2) PROF. DR. WAN JEFREY BASIRUN
5	NANOBIOTECHNOLOGY (HOB7009)	3	SATURDAY 7 <u>PM</u> - 10 PM	CUBE 1, LEVEL 4, IAS	(1) ASSOC. PROF. DR. NADER GHAFARI KHALIGH (C) (2) DR. CHEE CHIN FEI
6	ENVIRONMENTAL NANOBIOTECHNOLOGY (HOB7010)	3	SATURDAY 7 <u>PM</u> - 10 PM	CUBE 2, LEVEL 4, IAS	(1) DR. ZAIRA ZAMAN CHOWDHURY (C) (2) PROF. DR. MOHD RAFIE BIN JOHAN



SCORING

Candidates must pass all core courses and 2 elective courses and a minimum grade point 3.0 (Grade B) with a grade point average (GPA) of at least 3.0



Evaluation and scoring used for this program is based on the structural evaluation and scoring system adopted for semester at the Universiti Malaya

SCORING SYSTEM at the UNIVERSITI MALAYA

GRADE	SCORES	GRADE POINT	PURPOSE
A	80-100	4.0	Brilliant
A-	75-79	3.7	Brilliant
B +	70-74	3.3	Pass
B	65-69	3.0	Pass
B-	60-64	2.7	Failed
C +	55-59	2.3	Failed
C	50-54	2.0	Failed
C-	45-49	1.7	Failed
D +	40-44	1.5	Failed
D	35-39	1.0	Failed
F	0-34	0.0	Failed
U			Not satisfactory
R			Registered for audit
UW			Unofficial withdrawal
W			Official withdrawal
P			Progress
S			Satisfy
K			Notional
I			Unfinished

APPLICATION FOR PROPOSAL / CONFIRMATION / CANDIDATURE /

*All applications must be submitted before the stipulated date**

**Applications that not complete or received after the stipulated date will not be process and need to apply again next month
The seminar calendar is available at IAS Website*

01



CANDIDATE / SUPERVISOR

1. The **candidate** submits the application and all related document via google form at IAS Website based on seminar date.
2. The **supervisor** nominates two assessors (postdoc or RO is not allowed) with complete details via google form at IAS Website based on seminar date.

**(IAS Website (ias.um.edu.my) → Student Affairs → Seminar Calendar → Seminar Calendar 2026)*

**The required document submission, PD CD report format, and supervision confirmation form can be found here.*

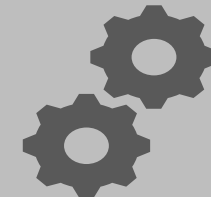
02



DEPUTY DEAN OFFICE

1. The DD's Office will sent and invitation email to the panel members one week before the online presentation.
2. Three days before the seminar session, the chairperson, panel members, supervisor, and student will receive the Microsoft Teams link for the session.

03



SEMINAR & RESULT ANNOUNCEMENT

1. Seminar will be conducted online using Microsoft Team platform.
2. The DD's Office will send the presentation results to the candidate and supervisor within one week after the seminar presentation.

**Please note that the results will only be released after the evaluation forms have been duly completed and signed by the Chairperson and panel members.*

ACADEMIC ADVISOR

Academic advisors are appointed from among the lecturers to guide the students in the planning of the students' academic programme of study. The academic advisors are responsible for:

1. Helping the students choose courses and the number of credits the students will take before the commencement of the semester.
2. Providing guidance to the students in overcoming problems related to learning, if any, based on the students' academic performance.
3. Students should meet with the academic advisors at least once in a semester.



5. All meetings between the academic advisors and the students must be recorded.
4. Students who are underachieved or under probation are compulsory to meet the academic advisors more than once.

THANK YOU

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