

MS4662 PROPOSED COURSE OUTLINE FOR APPRECIATING IP IN RESEARCH & DEVELOPMENT

Academic Year	2023-2024	Semester	2
Course Coordinator	MSE(UG) Academic Office/IPOS international		
Course Type	MPE/BDE		
Pre-requisites	NIL		
AU	3		
Grading	Letter Grading		
Contact Hours	Lectures: 26 hours Tutorials: 13 hours Total 39 hours		
Proposal Date	24 November 2023		

Course Aims

This course provides you with a working understanding on engineering research and development and intellectual property (IP) in related context. It also trains you to apply and use IP knowledge to address real-life IP-related issues in the R&D context.

Key themes that will be covered are assessing IP issues related to R&D, and the implementation and monitoring of suitable approaches to address these IP issues. Expanding on these, the course explores how an understanding of IP rights protection laws and their considerations can guide and support an organisation's R&D activities and strategies.

Particular emphasis will be placed on the practical and legal issues in relation to managing the R&D value chain of creation/innovation, identification, ownership, protection, and commercial exploitation of intellectual assets. Case studies related to various branches of engineering including materials science engineering, will be presented and discussed.

Intended Learning Outcomes (ILO)

By the end of this course, student will be able to:

- 1) Appraise the objectives and importance of R&D to an organisation.
- 2) Identify IP issues in relation to the R&D life cycle and context.
- 3) Assess relevant IP management matters in a given R&D context.
- 4) Formulate and recommend suitable approaches or relevant IP practices in order to maximize R&D outcomes.
- 5) Develop ways to address IP issues arising in R&D life-cycle and R&D management processes.
- 6) Explain which stakeholders should be collaborated with in an R&D context.

Course Content

No	Topic	Hours
1.	Introduction & Importance of R&D	3
2.	Objectives of R&D (4 hours)	5
3.	Assessing IP Issues in Relation to R&D: Types of IP Rights, Knowledge Leakages, Trade Secrets, Collaboration Issues, Methods of Commercialization, Infringement Avoidance	12
4.	Objectives of approaches to address IP issues	5
5.	Implementing Courses of Action to address IP issues	8
6.	Assessing IP Issues in Relation to R&D: Monitoring Implementation	3
7.	Introduction & Importance of R&D	3
	Total	39

Assessment (Includes both continuous and summative assessment)

Component	Course LO Tested	Related Programme LO or Graduate Attributes	Weighting	Team/ Individual	Assessment rubrics
1. Continuous Assessment (CA) 1: Common Test (Duration: 1 hour; closed book; Answer booklet is required.)	ILO (1) up to ILO (4)	EAB SLO (f)	20%	Individual	N.A.
2. CA 2: Group Assignment (written response and presentation)	ILO (2) up to ILO (6)	EAB SLO (f) and (i)	20% Team: 15% Individual*: 5%	Team & Individual	Appendix 1
3. Final Examination (Duration: 2 hours; closed book; Answer booklet is required.)	ILO (1) up to ILO (6)	EAB SLO (f)	60%	Individual	N.A.
Total			100%		

* Individual components can be assessed through the student's performance during the presentation or other forms of *viva voce* (as needed).

Description of Assessment Components

EAB Graduate Attributes ¹	
a)	Engineering Knowledge Apply the knowledge of mathematics, natural science, engineering fundamentals, and an engineering specialisation as specified in WK1 to WK4 respectively to the solution of complex engineering problems.
b)	Problem Analysis Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
c)	Design/Development of Solutions Design solutions for complex engineering problems and design systems, components or processes that meet the specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
d)	Investigation Conduct investigations of complex problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
e)	Modern Tool Usage Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering problems, with an understanding of the limitations.
f)	The Engineer and Society Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems.
g)	Environment and Sustainability Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts.
h)	Ethics Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
i)	Individual and Team Work Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
j)	Communication Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
k)	Project Management and Finance Demonstrate knowledge and understanding of engineering management principles and economic decision-making, and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
l)	Life-long Learning Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

¹ Reference: [EAB Accreditation Manual](#)

Formative Feedback

1. In respect of your responses to hypothetical problem questions attempted during tutorial
2. Review session post CA1 (common test).
3. In respect of your presentation deliverables for CA2 (component of group assignment); feedback will be given post-presentation.
4. Review session ahead of final written examination, as a class and on an individual basis (voluntary).

Learning & Teaching Approach

Approach	How does this approach support students in achieving the learning outcomes?
Lecture	You will be presented with overviews and key takeaways in the lecture presentations, using standard presentation formats enhanced with online resources (where applicable) to illustrate explanations.
Tutorial	You will be presented with hypothetical fact patterns that you will work through in a guided manner (modified essay question). You will be required to formulate the responses in a group, and present the same to the whole class, and receive feedback as to the accuracy of responses.
Group assignment	Groups will be given one assignment brief containing 2 main deliverables: a) presentation as a group; b) a written report/memorandum

Readings & References

- IPA-authored Learner's Guide containing key content (required)
- Martin A. Bader, *Intellectual Property Management in R&D Collaborations*, SPRINGER, 2006.

Course Policy & Student Responsibility

As a student of the course, you are required to abide by both the University Code of Conduct and the Student Code of Conduct. The Codes provide information on the responsibilities of all NTU students, as well as examples of misconduct and details about how students can report suspected misconduct. The university also has the Student Mental Health Policy. The Policy states the University's commitment to providing a supportive environment for the holistic development of students, including the improvement of mental health and well-being.

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a

set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognise your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion and cheating. If you are uncertain about the definitions of any of these terms, you should refer to the [Academic Integrity Handbook](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

On the use of technological tools (such as Generative AI tools), different courses/assignments have different intended learning outcomes. Students should refer to the specific assignment instructions on their use and requirements and/or consult your instructors on how you can use these tools to help your learning.

Course Instructors

Instructor	Office Location	Phone	Email
POS International	1 Paya Lebar Link #11-03, PLQ 1, Paya Lebar Quarter, Singapore 408533	6330 8660	gradstudies@iposinternational.com

Planned Weekly Schedule

Week	Topic	Course LO	Readings/ Activities
1	Introduction & Importance of R&D	ILO (1)	Prescribed Learner's Guide reading; lecture
2	Objectives of R&D	ILO (1)	Prescribed Learner's Guide reading; lecture; tutorial involving case study analysis
3	Objectives of R&D	ILO (1)	Prescribed Learner's Guide reading; lecture; tutorial involving case study analysis
4	Assessing IP Issues in Relation to R&D: Confidentiality; R&D collaboration; IP Commercialization; Avoiding IP Infringement	ILO (2) to (4)	Prescribed Learner's Guide reading; lecture; tutorial involving case study analysis

5	Assessing IP Issues in Relation to R&D: Confidentiality; R&D collaboration; IP Commercialization; Avoiding IP Infringement	ILO (2) to (4)	Prescribed Learner's Guide reading; lecture; tutorial involving case study analysis
6	Assessing IP Issues in Relation to R&D: Confidentiality; R&D collaboration; IP Commercialization; Avoiding IP Infringement	ILO (2) to (4)	Prescribed Learner's Guide reading; lecture; tutorial involving case study analysis
7	Objectives of approaches to address IP issues	ILO (4) to (5)	
8			
9	CA1	ILO (1) to (4)	Carried out in lecture session
10	Implement Suitable Approaches and Monitor Implementation	ILO (4) to (5)	
11	Relevant Stakeholders to Liaise with	ILO (5) to (6)	Prescribed Learner's Guide reading; lecture; tutorial involving case study analysis
12	CA2 Preparation (Group)	ILO (2) to (6)	Prescribed Learner's Guide reading; lecture
13	CA2 (Group)	ILO (2) to (6)	Carried out in lecture session
14	Examination review	ILO (1) to (6)	Lecture (summary of main topics), tutorial consults on individual basis