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TECHNOLOGY INNOVATION & R&D PRINCIPLES — 10-HOUR EXAM MASTERY (TID7101)

OIST Online · Engineering & Technology Management · course outline
Issued 22 November 2026

Level	**Advanced**
Duration	**10 hours**
Weekly effort	**About 10 hours of lessons plus a 2-hour mock test**
Content	**10 modules · 57 lessons · 12 h 43 min**
Format	**Online, self-paced**
Fee	**Free**
Certificate	**Certificate of Completion**
Instructor	**Eng. Emmanuel Ogwang, Senior Lecturer, Medical Technology Education and Training**

Ten focused hours that take you from first principles to top-grade answers: innovation types and drivers, IP, R&D, technology life cycles, diffusion, technology transfer, the Triple Helix, innovation culture and change. Hand-picked videos, Ugandan cases, model answers to every past test question since 2023, and timed mocks.

WHAT YOU WILL LEARN

- Distinguish technology, science, invention, creativity and innovation, and technology adoption from adaptation, with examples
- Explain product, process and business model innovation and how each drives economic growth
- Describe incremental, radical and disruptive product innovation and apply them to companies such as Apple, Crown Beverages and Ugachick
- Identify the key drivers of innovation in an industrial economy
- Explain how patents, copyrights, trademarks and trade secrets affect a firm's innovation and competitiveness
- Use cases (Nokia vs Samsung, Meta vs Alphabet, iPhone 15 and iPhone Air) to argue for a strong R&D function
- Apply needs finding, ethnography, divergent and convergent thinking and the rules of structured brainstorming
- Draw and explain the technology life cycle (S-curve) of a product or service
- Distinguish adoption from diffusion, state Rogers' four elements of diffusion and the five product characteristics that speed or slow it
- Explain barriers to technology transfer and judge models such as Kiira Motors and Volkswagen Rwanda

- Apply the Triple Helix model to Ugandan policy (STI Policy 2009, NDP III) and to real controversies
- Analyse innovation ecosystems: incubators, commodity clusters and telecom market structure
- Present an eight-point strategy to build a culture of innovation
- Apply Lewin and Kotter to win acceptance for a change such as a university commercialisation office
- Write structured, example-rich answers that earn full marks under time pressure

REQUIREMENTS

- Registered for TID7101 Technology Innovation and R&D Principles (or any postgraduate innovation management course)
- A smartphone or computer with internet for the videos (about 1 GB in total)
- A notebook for writing practice answers by hand
- About 10 hours: one hour a day over two weeks works well

ABOUT THIS COURSE

Why this course exists

Technology Innovation and R&D Principles is examined with short, structured questions worth 2 to 12 marks each. The same twelve ideas come back every year: types and drivers of innovation, intellectual property, the role of R&D, the technology life cycle, diffusion, technology transfer and its barriers, the Triple Helix and innovation ecosystems, innovation culture and change management. Students lose marks not because the ideas are hard, but because they write vague answers without definitions, examples or structure.

This course fixes both problems. Each unit rebuilds one idea from first principles in plain English, shows it working in Ugandan and global cases (Kiira Motors, Volkswagen Rwanda, MTN and Airtel, Nokia and Samsung, the iPhone, the Nakivubo Channel), and then walks you through every related past test question with a full model answer and the marking logic behind it.

How it works

- 10 hours in total, in ten units of about an hour each.
- Short, high-quality videos from TED, Harvard Business Review, WIPO, IDEO, VOA and other leading channels.
- Notes in your own words with the definitions, lists and diagrams examiners look for.
- Model answers to the 2023, 2024/25 and 2025 papers, written the way a top-scoring student writes.
- A quiz after every unit and a final timed mock test with a marking guide.

The 95% method

Every answer in this course follows one pattern: Point ? Explain ? Example. If you learn the content and write every point this way, you give the examiner exactly what the marking guide rewards.

COURSE CONTENT

Module 1 · TIR-U0 · Unit 0 — Start Here: How the Test Works and How to Score 95%

About 35 minutes. What three past papers (2023, 2024/25, 2025) reveal, the topics that repeat, the Point–Explain–Example method, and a diagnostic quiz.

#	LESSON	TYPE	MINUTES
1	Start here · Welcome: ten hours to mastery	Reading	8
2	Start here · The test decoded: what three past papers tell us	Reading	15
3	Start here · The Point–Explain–Example method	Reading	7
4	Start here · Watch: Where good ideas come from	Video	5
5	Start here · Diagnostic quiz: where are you now?	Quiz	8

Module 2 · TIR-U1 · Unit 1 — Technology, Innovation and Where Ideas Come From

About 50 minutes. Science, engineering and technology; invention, creativity and innovation; technology vs innovation; adoption vs adaptation; appropriate and high technology; from knowledge to diffusion.

#	LESSON	TYPE	MINUTES
1	Unit 1 · Notes: Technology and innovation from first principles	Reading	25
2	Unit 1 · Watch: The innovation matrix	Video	4
3	Unit 1 · Past questions with model answers	Reading	15
4	Unit 1 · Quiz	Quiz	8

Module 3 · TIR-U2 · Unit 2 — Types and Drivers of Innovation

About 65 minutes. Product, process and business model innovation and economic growth; incremental, radical and disruptive innovation; drivers of industrial innovation; selling, creativity and prototyping assertions.

#	LESSON	TYPE	MINUTES
1	Unit 2 · Notes: Types of innovation and how they drive growth	Reading	18
2	Unit 2 · Watch: Disruptive innovation explained	Video	4
3	Unit 2 · Watch: IDEO redesigns the shopping cart	Video	8
4	Unit 2 · Watch: Build a tower, build a team	Video	7
5	Unit 2 · Past questions with model answers	Reading	20
6	Unit 2 · Quiz	Quiz	8

Module 4 · TIR-U3 · Unit 3 — Intellectual Property and Capturing the Returns to Innovation

About 50 minutes. Patents, copyright, trademarks and trade secrets; how IP shapes innovation and competitiveness; lead time and complementary assets; leaders vs followers; standards.

#	LESSON	TYPE	MINUTES
1	Unit 3 · Notes: Intellectual property and capturing value	Reading	18
2	Unit 3 · Watch: Patents, copyrights, trademarks and trade secrets	Video	5
3	Unit 3 · Past question with model answer	Reading	12

#	LESSON	TYPE	MINUTES
4	Unit 3 · Quiz	Quiz	7

Module 5 · TIR-U4 · Unit 4 — R&D, Needs Finding and Idea Generation

About 70 minutes. The R&D function and technology management process; R&D cases (Nokia vs Samsung, Close-up vs Colgate, iPhone 15 USB-C, Meta vs Alphabet, Crown vs Century, iPhone Air); needs finding, ethnography, divergent and convergent thinking, brainstorming rules.

#	LESSON	TYPE	MINUTES
1	Unit 4 · Notes: The R&D function and managing technology	Reading	15
2	Unit 4 · Notes: Needs finding, ethnography and structured brainstorming	Reading	12
3	Unit 4 · Watch: How did Nokia fall?	Video	13
4	Unit 4 · Watch: IDEO’s brainstorming rules	Video	4
5	Unit 4 · Past questions with model answers	Reading	20
6	Unit 4 · Quiz	Quiz	8

Module 6 · TIR-U5 · Unit 5 — The Technology Life Cycle and Diffusion of Innovations

About 65 minutes. The S-curve and technology life cycle; dominant designs; adoption vs diffusion; Rogers' four elements; five product characteristics; adopter categories.

#	LESSON	TYPE	MINUTES
1	Unit 5 · Notes: The technology life cycle	Reading	15
2	Unit 5 · Watch: S-curves in innovation	Video	4
3	Unit 5 · Notes: Diffusion of innovations	Reading	12
4	Unit 5 · Watch: How new ideas spread	Video	5
5	Unit 5 · Watch: How great leaders inspire action	Video	18
6	Unit 5 · Past questions with model answers	Reading	15
7	Unit 5 · Quiz	Quiz	8

Module 7 · TIR-U6 · Unit 6 — Technology Transfer: From Labs to Market

About 60 minutes. Meaning, channels and types of technology transfer; barriers across economies; Kiira Motors vs Volkswagen Rwanda; incubators; AI for the last-mile person.

#	LESSON	TYPE	MINUTES
1	Unit 6 · Notes: Technology transfer and its barriers	Reading	18
2	Unit 6 · Watch: What is technology transfer?	Video	3
3	Unit 6 · Watch: Inside the Kiira Motors factory	Video	5
4	Unit 6 · Watch: What is an incubator?	Video	4

#	LESSON	TYPE	MINUTES
5	Unit 6 · Past questions with model answers	Reading	20
6	Unit 6 · Quiz	Quiz	7

Module 8 · TIR-U7 · Unit 7 — The Triple Helix and Innovation Ecosystems

About 60 minutes. University–industry–government roles; STI Policy 2009 and NDP III; incubation centres and commodity clusters; telecom ecosystem; Nakivubo Channel and university mandate cases.

#	LESSON	TYPE	MINUTES
1	Unit 7 · Notes: The Triple Helix and innovation ecosystems	Reading	15
2	Unit 7 · Watch: Insights into the Triple Helix model	Video	6
3	Unit 7 · Watch: The Triple Helix, a conceptual overview	Video	6
4	Unit 7 · Past questions: the Triple Helix applied	Reading	22
5	Unit 7 · Past questions: ecosystems, incubators, clusters and telecoms	Reading	15
6	Unit 7 · Quiz	Quiz	7

Module 9 · TIR-U8 · Unit 8 — Innovation Culture, Leadership and Managing Change

About 70 minutes. What an innovative culture is; the eight-point culture strategy; creativity process and killers; resistance to change; Lewin and Kotter; the commercialisation office case.

#	LESSON	TYPE	MINUTES
1	Unit 8 · Notes: Building a culture of innovation	Reading	14
2	Unit 8 · Watch: How to manage for collective creativity	Video	17
3	Unit 8 · Notes: Managing change and resistance	Reading	12
4	Unit 8 · Watch: Lewin’s unfreeze, change, refreeze	Video	8
5	Unit 8 · Watch: Kotter’s eight-step change model	Video	8
6	Unit 8 · Watch: John Kotter on resistance to change	Video	3
7	Unit 8 · Past questions with model answers	Reading	18
8	Unit 8 · Quiz	Quiz	7

Module 10 · TIR-U9 · Unit 9 — Exam Clinic and Timed Mock Test

About 2 hours. One-page revision sheet, a full mock test in the real format, its marking guide, a timed objective test and an optional marked submission.

#	LESSON	TYPE	MINUTES
1	Unit 9 · The one-page revision sheet	Reading	12
2	Unit 9 · Full mock test (2 hours, attempt all questions)	Reading	120

#	LESSON	TYPE	MINUTES
3	Unit 9 · Mock test: marking guide	Reading	30
4	Unit 9 · Timed objective test	Quiz	25
5	Unit 9 · Submit your mock test for marking (optional)	Assignment / exam	10

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