RMIT UNIVERSITY

From Lecture to Production Line

Building learner agency in Food Processing Technology

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UDL beyond the classroom

Industry-linked learning

Why this course matters: from principles to food processing decisions

Food processing decisions affect food safety, shelf life, product quality, nutrition, sustainability and consumer acceptance.

Engineering principles

- Heat transfer
- Mass transfer
- Mass balance
- Fluid flow
- Bernoulli equation

Processing technologies

- Thermal processing
- Drying, evaporation and distillation
- Refrigeration and freezing
- Membrane filtration and HPP
- Ultrasound

Product and industry outcomes

- Food safety and shelf life
- Sensory quality and nutrition
- Sustainability and feasibility
- Consumer acceptance
- Industry-ready decisions

The learning challenge is helping students connect these topics and apply them to justified food processing decisions.

The teaching & learning challenges

Students know the fundamentals, but were uncertain how to apply them in real manufacturing contexts.

TRADITIONAL EXPERIENCE

Lectures
Concepts presented in isolation

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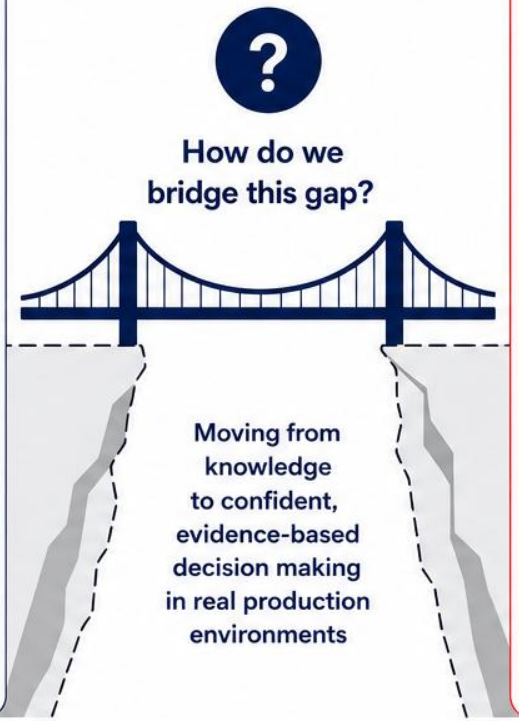
Memorisation
Focus on recalling information

↓

Assessment
Test what students remember

↓

Limited application
Uncertain how to apply in real manufacturing contexts



WHAT WE WANT

Understand concepts
Deep understanding of principles

↓

Apply & analyse
Use knowledge to analyse real situations

↓

Make decisions
Choose appropriate technology and parameters

↓

Real-world impact
Confident, evidence-based decisions in industry

The challenge: Transforming passive learning into active, authentic learning that builds learner agency and industry-ready graduates.

Our redesign approach: UDL 3.0

We used Universal Design for Learning 3.0 to shift from content coverage to capability.

Goal: Empower every student to become a confident, independent decision-maker in real food processing contexts.

UDL 3.0 FRAMEWORK

ENGAGE
Motivate through choice and relevance

- Offer choice and autonomy
- Connect learning to real-world contexts
- Build interest, value and belonging

REPRESENT
Provide multiple ways to access information

- Multiple formats (videos, readings, visuals, demonstrations)
- Connect new ideas to prior knowledge
- Make content clear, scaffolded and accessible

ACT
Enable authentic practice and decision making

- Apply knowledge in authentic tasks
- Make evidence-based decisions
- Receive feedback and reflect to improve

UDL 3.0 shifts our course from telling students what to learn, to empowering them how to learn, practice and transfer with confidence.

Our learning journey

A scaffolded pathway from theory to industry that builds knowledge, skills and confidence step-by-step.

BUILD FOUNDATIONS → APPLY & PRACTISE → TRANSFER & IMPACT

1. PREPARE
Pre-class microvideos and resources build foundational understanding.

2. LEARN
Lectures connect principles with real food processing applications.

3. TUTORIALS
Case studies and problems help apply concepts and make decisions.

4. LABORATORIES
Hands-on experiments generate data and build evidence-based understanding.

5. PILOT PLANT
Operate pilot-scale equipment and observe how theory works in real processes.

6. INDUSTRY
Engage with industry experts and visit facilities to see real-world practice.

OBSERVE → Understand the concepts

APPLY → Use knowledge in new situations

EVALUATE → Analyse results and make judgements

TRANSFER → Apply learning in real-world contexts

Each step builds capability and confidence, developing evidence-based decision makers ready for the challenges of the food industry.

Flexible access to learning

Students access content through **multiple pathways** to build understanding on their own terms.

MICRO-VIDEOS

Short, focused videos introduce key concepts and systems.

CANVAS RESOURCES

Readings, notes and activities organised for easy navigation.

RECORDED LECTURES

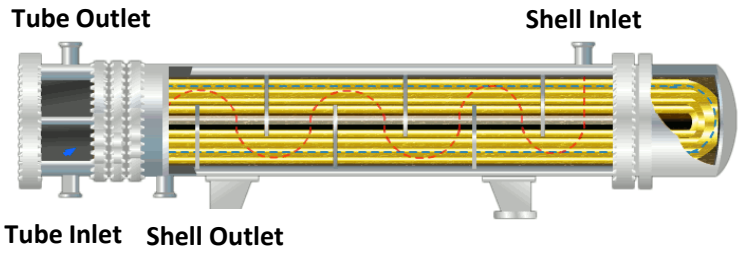
Full lectures available for flexible review and revision.

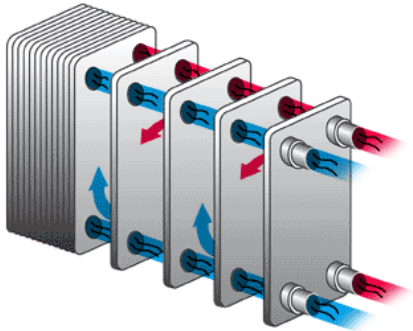
EQUIPMENT VIDEOS

See how industrial equipment works in real processing lines.

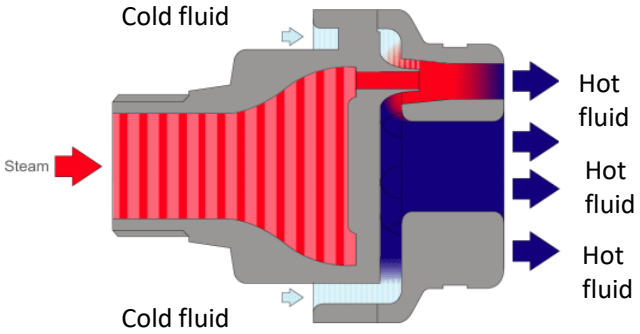
Tutorials bridge theory to application

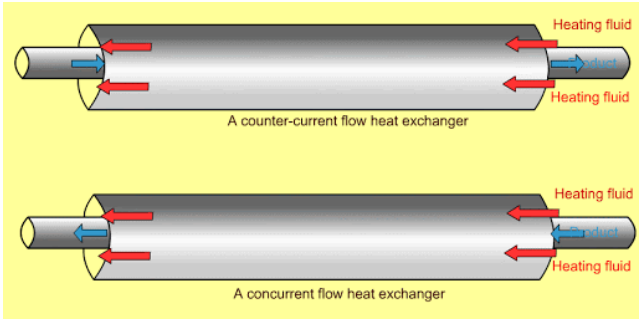
Weekly tutorials use authentic food scenarios to help students make, justify and communicate processing decisions.





Milk





Tomato sauce

Soup with particles

DECISION What would you do and why?

REASON Explain using principles and assumptions.

EVIDENCE Use data, calculations or literature.

LIMITATION What are the risks or trade-offs?

Students move from structured guidance to independent, evidence-informed decisions.

Product design in action; Learning through case studies

Students see how processing decisions are interconnected rather than isolated.

1 Shelf-stable Matcha Syrup

Decision factors:

- water activity and Brix
- viscosity and pumpability
- pH and pasteurisation
- shelf life and quality
- packaging
- storage conditions

Outcome: convenient, consistent, high-quality shelf-stable syrup.

2 Seafood By-product to Umami Powder

Decision factors:

- process type (drying)
- water activity
- flavour retention
- fat oxidation control
- powder stability
- packaging
- storage conditions

Outcome: stable, flavourful, value-added umami ingredient.

3 Canned Tomato Soup vs Green Beans

Decision factors:

- pH and acid/low-acid foods
- target microorganisms
- heat penetration
- process severity (F_0)
- product composition
- shelf life and safety

Outcome: safe, shelf-stable products with the right thermal process.

From classroom to pilot plant practice

Students build learner agency by solving real food manufacturing challenges.

CASE 1: SPRAY DRYING

Produce a high-quality whey protein powder

STUDENTS DECIDE

- Inlet and outlet temperatures
- Feed rate into the dryer
- Operating conditions to improve efficiency

EVIDENCE USED

- Moisture content (IR moisture meter)
- Water activity
- Particle size distribution (Malvern Mastersizer™)
- Thermal efficiency

CASE 2: CANNING & STERILISATION

Produce safe and high-quality canned asparagus

STUDENTS DECIDE

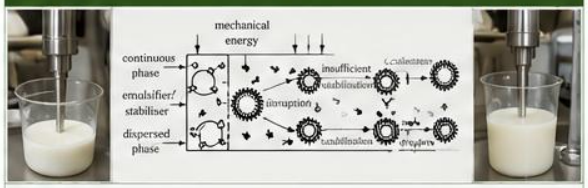
- Sterilisation temperature and time
- Brine concentration and headspace
- Cooling strategy and process control

EVIDENCE USED

- pH before & after canning
- Colour (L*, a*, b*) and appearance
- Texture / hardness (TPA)
- Temperature–pressure profiles (retort data)

CASE 3: ULTRASONIC EMULSIFICATION

Develop a stable emulsion with desired properties



STUDENTS DECIDE

- Sonication time and energy input
- Processing temperature
- Oil phase and surfactant selection

EVIDENCE USED

- Particle size (Malvern analyser)
- Temperature rise during sonication
- Emulsion stability and appearance

Comparing lab-made and commercial products

REAL CHALLENGE
Based on industry problems and goals

MAKE DECISIONS
Select technology, equipment and parameters

ANALYSE EVIDENCE
Collect and interpret data to evaluate outcomes

JUSTIFY OUTCOMES
Explain and defend decisions with evidence

Students experience the same decision-making process used in real food manufacturing environments.

Learning from industry experts

Guest speakers helped students see how food processing concepts are applied in real manufacturing decisions.

Kraft Heinz

- Commercial sterilisation
- Process validation
- Food safety decisions

Asahi Beverages

- Pasteurisation
- Filtration
- Production scale

Edlyn Foods

- Product development
- Quality systems
- Manufacturing context

Real insights. Real challenges. Real impact
Industry guests bridge the gap between theory and practice by showing how processing decisions affect safety, quality, production scale and consumer-ready products.

Industry site visit

Connecting classroom learning with real manufacturing environments.

Industry site visits are a key part of the course's Industry Embedded Activity design. Students visit commercial food manufacturing facilities such as Asahi Beverages and Edlyn Foods to observe large-scale processing systems in operation and see how theoretical principles are applied in professional settings.

Students gain:

Real-world exposure
Observe large-scale food processing systems in operation.

Industry standards
Understand quality, safety and operational standards used in the industry.

Apply classroom knowledge
See how theoretical principles are enacted in professional settings.

Build confidence
Develop confidence to apply food processing knowledge in real workplace contexts.

Figure 1 Food Processing Technology students on an industry site visit at Asahi Beverages, Melbourne

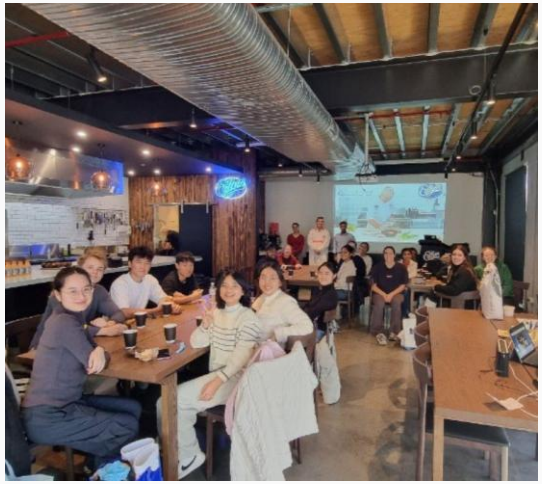


Figure 2 Food Processing Technology students on an industry site visit at Edlyn Foods, Melbourne

Evidence of impact

Overall Satisfaction Indicator (OSI)

Students reported:

- Greater confidence
- More engagement
- Better understanding
- Real-world readiness

Significant improvement in student experience

Student voices

Real conversations. Real expectations.

"Some of the highlights have been going on site tours of various companies such as Asahi and Edlyn Foods. These provide great insight into the real-world applications of the principles and concepts we study in class, as well as exposure to the environment and equipment of commercial-scale food processing.."

— **Arnold Blignaut**
Bachelor of Food Technology and Nutrition

"The combination of theory, practical knowledge, and industry involvement was well structured and helpful in preparing me for a future in the food sector.

— Student's feedback, Sem 1, 2025

"I found the workshops really helpful in understanding the content. Mina did a great job of taking us through each question and checking along the way that everyone understood. I also enjoyed the labs that we did... "

— Student's feedback, Sem 1, 2024

Your turn: Think like a food technologist

A sample tutorial case: choosing processing technologies based on product outcomes

Industry scenario

A dairy company wants to produce shelf-stable drinking milk that can be stored at room temperature for 6 months.

Students consider:

- food safety
- shelf life
- product quality
- packaging
- storage conditions

UDL connection: Students compare technologies, justify decisions, and connect processing choices with real product outcomes — rather than simply recalling techniques or equipment principles.

A dairy company wants to produce drinking milk that remains shelf-stable for 6 months. Which processing strategy is most appropriate?

Justification

Why is the selected processing strategy the most appropriate?

Thank you!

Building learner agency through industry-linked learning.

Flexible access

Learning for all students, anytime, anywhere.

Authentic practice

Connecting theory to real-world food processing.

Industry engagement

Learning with and from industry professionals and workplaces.

Confident graduates

Prepared to make informed decisions and create impact.