

PROCESS AND RESOURCES ENG. (PROC)

PROC 1003 Food Science 1 (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc1003/>) **Legacy Code:** 700265

Food provides sustenance to life, nutrition for good health, enjoyment and cultural identity. Students will gain an awareness of the history and cultural significance of food and its traditions in Australia and around the world. This subject introduces the basic principles for understanding the science behind food; its composition, chemical, physical and functional characteristics. Fruits and vegetables, cereal, meat and dairy products will be covered, how they are processed and impacts on food quality and nutrition. Current issues will be discussed, such as world food supply, food-borne disease, diet and health, and new trends in food. Students will need to attend the Hawkesbury Campus for Lectures and Practicals.

Level: Undergraduate Level 1 subject

Equivalent Subjects: PROC 1002 - Food Science 1 PROC 1001 - Food Science 1 LGYB 8736 - Food Science and Technology Practicum 11

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 1005 Introduction to Food Science and Nutrition (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc1005/>) **Legacy Code:** 301444

Food provides sustenance to life, nutrition for good health, enjoyment and cultural identity. Students will study the history and cultural significance of food and its traditions in Australia and around the world. This subject introduces the basic principles for understanding the science behind food; its composition, chemical, physical and functional characteristics. Fruits and vegetables, cereal, meat and dairy products will be covered, how they are processed and impacts on food quality and nutrition. Current issues will be discussed, such as world food supply, food-borne disease, diet and health, and new trends in food. Students will further gain a general understanding of the macronutrients such as carbohydrates, proteins and lipids in human metabolism and energy release. The role of water and electrolytes in cellular and tissue functions will be covered. The micronutrients are also studied, including the properties, general requirements, functions.

Level: Undergraduate Level 1 subject

Equivalent Subjects: PROC 1001 - Food Science 1 LGYB 8736 - Food Science Technology Practicum 11 PROC 1002 - Food Science 1 PROC 1003 - Food Science 1 (WSTC)

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 1006 Materials Engineering Fundamentals (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc1006/>) **Legacy Code:** 301414

This subject will introduce students to the foundations of chemistry, exploring the molecular nature of matter and change which is essential foundational knowledge for a career in materials engineering. From atomic structure and the understanding of the periodic properties of elements, students learn about the chemical bonds and intermolecular forces that are responsible for determining the structure and properties of materials. Students put theory into practice by conducting and reporting on laboratory experiments to test the principles of chemical equilibrium, chemical reactions involving acids/bases, electron transfer as well as thermodynamics and kinetics of chemical processes.

Level: Undergraduate Level 1 subject

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 1007 Introduction to Food Science (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc1007/>) **Legacy Code:** 700334

Food provides sustenance to life, nutrition for good health, enjoyment and cultural identity. Students will study the history and cultural significance of food and its traditions in Australia and around the world. This subject introduces the basic principles for understanding the science behind food; its composition, chemical, physical and functional characteristics. Fruits and vegetables, cereal, meat and dairy products will be covered, how they are processed and impacts on food quality and nutrition. Current issues will be discussed, such as world food supply, food-borne disease, diet and health, and new trends in food. Students will need to attend the Hawkesbury Campus for Lectures and Practicals.

Level: Undergraduate Level 1 subject

Equivalent Subjects: PROC 1002 Food Science 1 PROC 1001 Food Science 1 LGYB 8736 Food Science Technology Practicum 11 PROC 1003 Food Science 1 PROC 1005 Introduction to Food Science

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 1008 Introduction to Materials Engineering (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc1008/>) **Legacy Code:** 301421

Modern science and technology is highly dependent on materials whose properties can be controlled to accommodate a wide range of applications. Materials are of the utmost importance for scientists and engineers who need to select appropriate materials for system design and engineering applications. Students will explore the structure and properties of all types of materials, including metals, ceramics, polymers and composites through theories, principles and a range of experiments. Participation in the lab experiments puts theoretical knowledge into practice enhancing each student's understanding of materials properties, diffusion mechanisms, corrosion, and degradation as well as ways to achieve equilibrium. Graduates who have completed this subject may pursue careers as materials scientists, engineers, researchers, or consultants in industries such as aerospace, automotive, electronics, energy, biomedical, and manufacturing, among others.

Level: Undergraduate Level 1 subject

Equivalent Subjects: ENGR 1008 - Engineering Materials ENGR 1010 - Engineering Materials (WSTC)

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 1009 Materials Science in Engineering (WSTC) (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc1009/>)

This subject provides you with an introduction to the science of engineering materials and their application across various industries. It covers key topics such as atomic structure, interatomic bonding, crystalline structure, and defects in solids. You will learn about the mechanical and physical properties of a wide range of materials, including metals, ceramics, polymers, composites, and advanced materials. This subject will teach you how to select the right materials for specific engineering needs, while emphasising sustainability principles. You will gain hands-on experience in analysing material properties and understanding phase diagrams, corrosion, and degradation.

Level: Undergraduate Level 1 subject

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 2002 Novel Foods (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc2002/>) **Legacy Code:** 301452

This subject introduces students to the principles of food preservation, including heat treatments, chilling, freezing, dehydration, pickles and fermentation. Factors affecting food quality are explored with respect to microbial, chemical and physical changes in food and their effects on food safety, nutritional value and sensory characteristics. The basic principles of good manufacturing practises, sanitation and food safety assessment will be studied in relation to the development of new food products and design of safe food manufacturing processes. The application of the food preservation principles to the processing of food products is covered through hands-on practicals in the pilot plant.

Level: Undergraduate Level 2 subject

Pre-requisite(s): PROC 1005 - Introduction to Food Science and Nutrition

Equivalent Subjects: LGYB 8737 - Food Science Technology Practicum 12

PROC 1004 - Food Science 2

PROC 2001 - Food Science 2

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 2003 Materials Selection and Design (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc2003/>) **Legacy Code:** 301415

Materials are a critical point of consideration when designing a solution to a technical problem. However, materials can also be quite complex by themselves and can possess a range of properties which may only partially suit an intended solution. In this unit, students use real world scenarios to learn to make decisions concerning material selection under different circumstances, based upon technical requirements, and balanced against sustainability and cost.

Level: Undergraduate Level 2 subject

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 3003 New Food Product Development (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc3003/>) **Legacy Code:** 300915

This subject is a final year capstone subject where students work in a team environment to apply the knowledge previously gained through their studies in nutrition and food science to develop a novel food product. The entire process of product development will be covered, including: idea generation; collating market, technical and consumer information; consumer surveying to establish the need/desire for a new product; product innovation development; quality testing and packaging. Students will develop specialised knowledge of the total product development system, including the ability to design, develop formulations and evaluation of sensory properties. Final product assessment includes nutritional composition, microbiological analysis, sensory evaluation and labelling compliant with regulations. The project is run in the simulated industry environment; team work among the members plays a key part of the subject.

Level: Undergraduate Level 3 subject

Pre-requisite(s): NATS 3038 - Quality Assurance and Food Analysis

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 3007 Food Innovation and Processing Technologies (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc3007/>) **Legacy Code:** 301454

This subject will extend your understanding of current and emerging food processes and packaging technologies. You will gain an appreciation of the physicochemical processes involved in food manufacture and their integration to produce safe, nutritious and palatable food. You will become familiar with methods to monitor shelf life of foods, learn about packaging science and be able to select the most appropriate packaging solution for a range of food applications. The environmental impact of food processing and packaging will also be explored, along with the factors affecting the sustainability of food manufacture.

Level: Undergraduate Level 3 subject

Equivalent Subjects: PROC 3001 Advanced Food Science and Technology PROC 3002 Advanced Food Science and Technology
Incompatible Subjects: NATS 2016 Food Processing and Analysis PROC 3006 Packaging Science and Technology

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 3008 Materials Processing and Applications (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc3008/>) **Legacy Code:** 301411

This subject focuses on the materials aspects of advanced material processing with an emphasis on microstructures. This extends students' knowledge in advanced materials, their properties, processing technologies, potential applications and simulations. Students will gain skills and experience with commercial software packages to solve sophisticated problems associated with materials engineering as well as develop experimentation techniques for the validation of these problems.

Level: Undergraduate Level 3 subject

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 4001 Advanced Materials Topics (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc4001/>) **Legacy Code:** 301416

Advancements in materials have underpinned technological development since the earliest days of human civilisation. As the challenges of the 21st Century emerge, the development of advanced materials will undoubtedly prove crucial for achieving sustainable solutions. This subject is a research-led learning experience for students whereby advanced materials researchers from WSU and beyond will deliver a series of real-world case studies on their research. Students will be challenged to assess these different material contexts and respond to hypothetical problems by performing critical reviews, in-depth analyses and presenting expert recommendations.

Level: Undergraduate Level 4 subject

Restrictions: Please see the Subject Details page for any restrictions for this subject

PROC 4002 Engineering Materials from Waste (10 Credit Points)

Subject Details (<https://hbook.westernsydney.edu.au/subject-details/proc4002/>) **Legacy Code:** 301417

Students will learn about the high potential of waste materials produced by continually growing rapid urbanisation and rising populations, which can be widely reused in engineering projects such as buildings, roads. The focus of this subject is the use of solid waste such as glass, tailings and demolished waste in engineering materials such as concrete, road base and asphalt. In addition, students will explore several recycling and recovery processes and investigate the performance of waste incorporated into engineering materials. Students report on real world state-of-the-art developments while integrating concepts of the circular economy, Australian standards and regulations to ensure the compliance of the developed materials. Work Integrated Learning (WIL) is a component of this subject.

Level: Undergraduate Level 4 subject

Restrictions: Please see the Subject Details page for any restrictions for this subject