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Sample course outline
Food Science and Technology – ATAR Year 12

Unit 3 – Food diversity and equity
Unit 4 – The future of food

Semester 1

<table>
<thead>
<tr>
<th>Week</th>
<th>Syllabus content</th>
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</table>
| 1–2  | **Macronutrients**  
|      | • food sources and impact of macronutrient and water intake on health  
|      |   ▪ protein – complete and incomplete  
|      |   ▪ carbohydrates – starches, sugars, and fibre or cellulose  
|      |   ▪ lipids – saturated fats and oils, and unsaturated fats and oils  
|      | • digestion of macronutrients  
|      |   ▪ digestive tract  
|      |   ▪ associated organs of digestion  
|      |   ▪ mechanical digestion  
|      |   ▪ chemical digestion  
| 3    | **Micronutrients**  
|      | • food sources and impact of micronutrient intake on health  
|      |   ▪ fat-soluble vitamins – A, D, E and K  
|      |   ▪ water-soluble vitamins – B2 (riboflavin), B9 (folate), B12 (cobalamin) and C  
|      |   ▪ minerals – calcium, iron, sodium and potassium  
|      | • purpose of the Nutrient Reference Values (NRV) and the Recommended Daily Intakes (RDI)  
|      | • advantages and disadvantages of the consumption of micronutrient supplements  
| 4–5  | **Diet-related health**  
|      | • the effect of the consumption of functional foods on health  
|      |   ▪ digestive system  
|      |   ▪ cardio vascular system  
|      |   ▪ neural development  
|      |   ▪ skeletal structure  
|      |   ▪ blood sugar levels glycaemic index  
|      | • role of phytochemicals in promoting health  
|      |   ▪ phytoestrogens  
|      |   ▪ antioxidants  
|      |   ▪ probiotics  
|      | • diet-related health conditions  
|      |   ▪ food allergies – nuts, eggs, seafood  
|      |   ▪ food intolerances – gluten, lactose  
|      | • modification of food to meet the nutritional needs of individuals with a diet-related health condition  
|      |   ▪ food allergies  
|      |   ▪ food intolerances  
|      | • health conditions caused by the inability of the body to digest or absorb or metabolise nutrients  
|      |   ▪ diabetes  
|      |   ▪ coeliac  
|      |   ▪ lactose intolerance  
| 6–7  | **Health and wellbeing**  
|      | • national health priority areas and role in improving health in Australia  
|      | • influences on health and wellbeing  
|      |   ▪ genetics – gender, race, family history  
|      |   ▪ lifestyle – exercise, smoking, illicit drugs  
|      |   ▪ diet  

Sample course outline | Food Science and Technology | ATAR Year 12
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<th>Week</th>
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</table>
|       | • use of food selection models and the Australian Dietary Guidelines to evaluate the nutritional needs of population groups  
  ▪ anaemia  
  ▪ osteoporosis  
  ▪ malnutrition  
  ▪ obesity  
  ▪ cardiovascular disease  
  ▪ diabetes  
  **Task 1: Test – Nutrition** |
| 8–9   | **Influences on the properties of food**  
  • the effect of preservation methods on food  
    ▪ sensory properties  
    ▪ physical properties  
    ▪ chemical properties  
  • the function of natural food components in food processing  
    ▪ protein – albumin, gluten  
    ▪ carbohydrates – starch, sugar  
    ▪ lipids – fats, oils  
  • factors that impact on the properties of food  
    ▪ processing techniques  
    ▪ equipment and storage  
    ▪ environment  
    ▪ ingredients  
    ▪ additives – thickeners, anti-caking agents, humectants, colourings and flavourings, preservatives, and artificial sweeteners  
  • Australia New Zealand Food Standards Code requirement for the use of additives in food and for product recall  
  **Task 2: Properties of food**  
  **Functional properties and food processing**  
  • functional properties and how they determine the performance of food  
    ▪ dextrinisation  
    ▪ caramelisation  
    ▪ crystallisation  
    ▪ emulsification  
    ▪ gelatinisation  
    ▪ oxidation  
    ▪ denaturation  
    ▪ coagulation  
    ▪ leavening  
    ▪ aeration  
    ▪ rancidity  
  • how and why food processing techniques are used to control the performance of food  
    ▪ application of heat  
    ▪ application of cold  
    ▪ exposure to air  
    ▪ addition of acid  
    ▪ addition of alkali  
    ▪ manipulation  
  • Australian Standard metric measurement |
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<tr>
<th>Week</th>
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<tr>
<td>12–14</td>
<td><strong>Production analysis</strong></td>
</tr>
<tr>
<td></td>
<td>• recipe adaptation</td>
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<tr>
<td></td>
<td>▪ nutrition</td>
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<td>▪ portions</td>
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<td>▪ cost</td>
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<td>• product proposal</td>
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<td>▪ consumer profile</td>
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<td>▪ product purpose</td>
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<td>▪ product specifications that include at least two functional properties</td>
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<td>• the technology process to produce a food product with at least two functional properties that meet product proposal specification</td>
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<td></td>
<td>▪ investigate</td>
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<td>▪ devise</td>
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<td>▪ produce</td>
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<td>▪ evaluate</td>
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<td>• analysis of food product</td>
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<td>▪ product’s compliance with the proposal</td>
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<td>▪ product’s sensory properties</td>
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<td>▪ effectiveness of the processing techniques selected</td>
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<td>▪ purpose of the functional properties selected</td>
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<td><strong>Task 3: Production analysis</strong></td>
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<td>15</td>
<td><strong>Food safety management</strong></td>
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<td>• apply the principles of the HACCP system to manage food safety</td>
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<td>▪ conduct a hazard analysis</td>
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<td>▪ identify critical control points</td>
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<td>▪ establish critical limits for each critical control point</td>
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<td>▪ establish critical control point monitoring requirements</td>
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<td>▪ establish corrective actions</td>
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<td>▪ verify procedures</td>
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<td>▪ establish record keeping procedures</td>
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<td>• <em>Food Act 2008 (WA)</em> and the role of state and local authorities to ensure food for sale is safe and suitable for human consumption</td>
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<td>• <em>Occupational Safety and Health Act 1984</em> and the consequences of unsafe work environments and practices for employers and employees</td>
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<tr>
<td></td>
<td>▪ economic</td>
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<td></td>
<td>▪ social</td>
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<tr>
<td>16</td>
<td><strong>Task 4: Semester 1 Examination</strong></td>
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<td>Week</td>
<td>Syllabus content</td>
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| 1–2  | **Promoting food**  
|      | • marketing mix strategies and the influence on consumers  
|      |   • product  
|      |   • price  
|      |   • place  
|      |   • promotion  
|      | • analysis of the marketing mix used to promote a food product  
|      |   • product  
|      |   • price  
|      |   • place  
|      |   • promotion  
|      | • consumer concerns related to food promotion  
|      |   • advertising directed at children  
|      |   • product placement in supermarkets  
|      | • implications of the *Australian Association of National Advertisers (AANA) Code for Advertising and Marketing Communications to Children*, on advertising and marketing food and beverage products in Australia  
|      | **Task 5: Food promotion**  
|      | **Food consumption patterns**  
|      | • factors that influence food consumption patterns in Australia  
|      |   • social  
|      |   • economic  
|      |   • environmental  
|      |   • ethical  
|      |   • political  
|      | • the impact of commercially processed food on the consumer  
|      |   • food safety  
|      |   • food availability  
|      |   • extend shelf life  
|      |   • convenience  
|      |   • alter sensory properties  
|      |   • health  
|      |   • distribution and storage  
|      |   • price  
|      | • mathematical concepts – data, graphs, tables, simple ratio, percentages  
| 3–4  | **Sustainable food production**  
|      | • environmental issues that impact sustainable production of food commodities  
|      |   • water use  
|      |   • land use  
|      |   • chemical use  
|      |   • energy use  
|      |   • waste disposal  
|      | • biotechnology in food systems  
|      |   • microorganisms  
|      |   • yeasts  
|      |   • genetic modification  
|      | • the process of genetic modification in food production  
|      | • benefits of genetic modification  
|      |   • improved yield  
|      |   • improved nutrition  
|      |   • resistance to environmental conditions  
|      |   • improved sensory properties  
|      |   • lower commodity prices for the consumer  

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<tr>
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</table>
| 7–8   | **Product development**  
|       | • factors that influence the development of new food products  
|       |   ▪ population growth  
|       |   ▪ changing demographics  
|       |   ▪ health  
|       |   ▪ convenience  
|       |   ▪ cost  
|       |   ▪ technology  
|       | • innovative developments that increase the availability of food  
|       |   ▪ value-added food  
|       |   ▪ functional food  
|       |   ▪ genetically modified food  
|       |   ▪ food safety procedures  
|       |   ▪ packaging  
|       | • product development using line extensions, ‘me too’ products and innovative products  
|       | • adaptations used to produce new products  
|       |   ▪ commodities  
|       |   ▪ processing techniques  
|       |   ▪ presentation or packaging  
|       |   ▪ equipment and technology  
|       |   ▪ quantities  
| 9     | **Technologies and new food products**  
|       | • technologies used to develop new food products  
|       |   ▪ ultrafiltration  
|       |   ▪ micro-encapsulation  
|       |   ▪ nanotechnology  
|       |   ▪ high pressure processing  
|       |   ▪ membrane technology  
|       |   ▪ packaging – modified atmosphere (vacuum, gas, barrier specific), aseptic, active and intelligent  
| 10–12 | **New product proposal**  
|       | • recipe adaptation  
|       |   ▪ commodities  
|       |   ▪ processing techniques  
|       |   ▪ presentation or packaging  
|       | • devise a product proposal for a new food product  
|       |   ▪ consumer profile  
|       |   ▪ product purpose  
|       |   ▪ product specifications  
|       | • the technology process to produce a new food product that responds to a consumer need  
|       |   ▪ investigate  
|       |   ▪ devise  
|       |   ▪ produce  
|       |   ▪ evaluate

- risks of genetic modification  
- impact on health  
- impact on environment  
- antibiotic resistance  
- Australia New Zealand Food Standards Code for food produced using gene technology

**Task 6: Sustainable food production**
<table>
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<tr>
<th>Week</th>
<th>Syllabus content</th>
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<tr>
<td></td>
<td>• analysis of food product in relation to product proposal</td>
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<tr>
<td></td>
<td>▪ features of the product and its suitability to the consumer group</td>
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<td>▪ quantitative method (survey)</td>
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<td>▪ qualitative method (sensory evaluation)</td>
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<td>▪ draw conclusions</td>
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<td>▪ make recommendations</td>
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<td>13–15</td>
<td><strong>Task 7: New product proposal</strong></td>
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<tr>
<td></td>
<td><strong>Our food supply</strong></td>
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<tr>
<td></td>
<td>• environmental influences on the sustainability of food production in Australia</td>
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<td>▪ farming practices</td>
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<td>▪ climate changes</td>
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<td>▪ water availability</td>
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<td>▪ land degradation</td>
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<td>• factors affecting food supply in Australia and globally</td>
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<td>▪ trade restrictions – embargos, tariffs, subsidies</td>
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<td>▪ government policies – free trade agreements, fair trade</td>
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<td>▪ ownership concentration within the food industry</td>
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<td>▪ natural disasters and the potential loss of infrastructure</td>
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<td>▪ production of biofuels</td>
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<td>▪ population growth and population distribution</td>
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<td>▪ food production and distribution</td>
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<td>▪ land ownership</td>
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<td>▪ food prices</td>
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<td>▪ demand for meat and dairy</td>
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<td>• consequences of global food inequity</td>
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<td>▪ under-nutrition</td>
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<td>▪ over-nutrition</td>
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<td>▪ political instability</td>
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<td>16</td>
<td><strong>Task 8: Semester 2 Examination</strong></td>
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