Sample Course Outline

Food Science and Technology

ATAR Year 12

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Sample course outline

Food Science and Technology – ATAR Year 12

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

Semester 1

|  |  |
| --- | --- |
| Week | Syllabus content |
| **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 (ascorbic acid)
	+ minerals – calcium, iron, sodium and potassium.
* purpose of the Nutrient Reference Values (NRV) and the Recommended Dietary 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
	+ cardiovascular 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.
 |
|  | * 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 processes 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** |
| **10–11** | **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:
	+ temperature – heat, cold
	+ exposure to air
	+ pH level
	+ addition of chemicals – salt, sugar
	+ removal of moisture
	+ manipulation.
* Australian Standard metric measurement.
 |
| **12–14** | **Production analysis*** recipe adaptation:
	+ nutrition
	+ portions
	+ cost.
* product proposal:
	+ consumer profile
	+ product purpose
	+ product specifications that include at least two functional properties.
* the technology process to produce a food product with at least two functional properties that meet product proposal specification:
	+ investigate
	+ devise
	+ produce
	+ evaluate.
* analysis of food product:
	+ product’s compliance with the proposal
	+ product’s sensory properties
	+ effectiveness of the processing techniques selected
	+ purpose of the functional properties selected.

**Task 3: Production analysis** |
| **15** | **Food safety management*** apply the principles of the Hazard Analysis Critical Control Point (HACCP) management system to manage food safety:
	+ conduct a hazard analysis
	+ identify critical control points
	+ establish critical limits for each critical control point
	+ establish critical control point monitoring requirements
	+ establish corrective actions
	+ verify procedures
	+ establish record keeping procedures.
* *Food Act 2008* (WA) and the role of state and local authorities to ensure food for sale is safe and suitable for human consumption.
* *Work Health and Safety Act 2020* and the consequences of unsafe work environments and practices for employers and employees:
	+ economic
	+ social.
 |
| **16** | **Task 4: Semester 1 Examination** |

Semester 2

|  |  |
| --- | --- |
| Week | Syllabus content |
| **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** |
| **3–4** | **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.
 |
| **5–6** | **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.
* 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** |
| **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.
* analysis of food product in relation to product proposal:
	+ features of the product and its suitability to the consumer group
	+ quantitative method (survey)
	+ qualitative method (sensory evaluation)
	+ draw conclusions
	+ make recommendations.

**Task 7: New product proposal** |
| **13–15** | **Our food supply*** factors affecting the sustainability of food production in Australia:
	+ farming practices
	+ climate change
	+ water availability
	+ land degradation.
* influences on the global food supply:
	+ trade restrictions – embargos, tariffs, subsidies
	+ government policies – free trade agreements, fair trade
	+ ownership concentration within the food industry – multi-national companies
	+ natural disasters and the potential loss of infrastructure
	+ land ownership.
* influences on the distribution of global food resources:
	+ production of biofuels
	+ population growth and population distribution
	+ food production and distribution
	+ food prices
	+ demand for meat and dairy.
* consequences of global food inequity:
	+ under-nutrition
	+ over-nutrition
	+ political instability.
 |
| **16** | **Task 8: Semester 2 Examination** |