**SECTION 1 - GENERAL INFORMATION**

<table>
<thead>
<tr>
<th>Award/s:</th>
<th>Total Course Credit Points:</th>
<th>Level:</th>
</tr>
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<tbody>
<tr>
<td>Bachelor of Health Science (Naturopathy)</td>
<td>128</td>
<td>2nd Year</td>
</tr>
<tr>
<td>Bachelor of Health Science (Nutritional and Dietetic Medicine)</td>
<td>96</td>
<td>2nd Year</td>
</tr>
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</table>

**Duration:** 1 Semester  
**Subject Coordinator:** Dr Mansi Dass Singh (Adelaide campus)

**Student Workload:**

<table>
<thead>
<tr>
<th>No. timetabled hours per week:</th>
<th>No. personal study hours per week:</th>
<th>Total hours per week:</th>
</tr>
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<tr>
<td>3</td>
<td>2</td>
<td>5</td>
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**Delivery Mode:**

- **Face to Face** (On campus): 1 x 3 hour lectures
- **e-Learning** (Online): Narrated PowerPoint presentations  
  Tutorials: Asynchronous tutor moderated discussion forum and activities  
  Student handouts, web-based resources
- **Intensive Delivery** (Summer School): Contact hours are delivered over 5 weeks with 2 x 4 hour days delivered per week  
  Content: Combination lecture and tutorial activities  
  Assessment: Report - Week 3; Integrative Biochemical Analysis - Week 5; Final Written Exam - Week 6

**Pre-requisites:** BIOH122, NMDF121  
**Co-requisites:** Nil

**SECTION 2 – ACADEMIC DETAILS**

**Subject Rationale**

This subject draws on students’ understanding of biochemistry and explores the biochemical activity in the human body of nutrients and food constituents. Students gain an appreciation of the clinical relevance of nutritional biochemistry and the influence of dietary modification and nutritional intervention on physiology. Essential biochemical pathways are explored along with the nutritional influences that moderate those pathways. Students develop an appreciation of, and differentiate between biological oxidation and the metabolic release of energy and learn about their significance in disease processes. Students learn about the influence of nutritional biochemistry in liver detoxification, neurotransmitter synthesis, antioxidant pathways and immune function. This subject deepens students’ understanding of nutrition and diet therapy and augments later nutritional medicine and clinical practicum subjects.
Learning Outcomes

1. Investigate the biochemical absorption, storage and metabolic function of macro- and micro- nutrients.
2. Investigate the major metabolic pathways including the role of nutrient cofactors, substrates, enzymes and coenzymes in maintaining normal metabolic function within the body.
3. Demonstrate an understanding of the inter-relationship between the nutrients involved in metabolic and detoxification pathways.
4. Examine and explain the links between inflammation, oxidation and antioxidants and the impact these can have on the different body systems and processes.

Assessment Tasks

<table>
<thead>
<tr>
<th>Type</th>
<th>Learning Outcomes Assessed</th>
<th>Session Content Delivered</th>
<th>Due</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report (750 words)</td>
<td>1 &amp; 3</td>
<td>1-4</td>
<td>Week 6</td>
<td>25%</td>
</tr>
<tr>
<td>Integrative Biochemical Analysis (1000 words)</td>
<td>2-4</td>
<td>5-10</td>
<td>Week 12</td>
<td>35%</td>
</tr>
<tr>
<td>Final Written Exam multiple choice, short answer and case study questions (1.5 hours)</td>
<td>1-4</td>
<td>1-13</td>
<td>Final Examination Period</td>
<td>40%</td>
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</table>

All written assessments and online quizzes are due at 11:55 p.m. and submitted through the LMS

Prescribed Readings:

Recommended Readings:
<table>
<thead>
<tr>
<th>Week</th>
<th>Lectures</th>
</tr>
</thead>
</table>
| 1.   | **Introduction** (Subject Outline / Subject Aims / Assessment / Teaching Resources)  
**Stimulation and Hormonal Regulation of the Digestive System**  
**Macronutrient Pharmacokinetics**  
- Biochemical mechanisms of digestion, absorption and metabolism  
- Transport and storage physiology  
- Agonists and antagonists |
| 2.   | **Water Soluble Vitamin Pharmacokinetics**  
- Biochemical mechanisms of digestion, absorption and metabolism  
- Transport and storage physiology  
- Agonists and antagonists  
**Nutrient Control of Gene Expression** |
| 3.   | **Fat Soluble Vitamin and Macromineral Pharmacokinetics**  
- Biochemical mechanisms of digestion, absorption and metabolism  
- Transport and storage physiology  
- Agonists and antagonists  
**Clinical Issues of Macromineral Metabolism** |
| 4.   | **Micromineral Pharmacokinetics**  
- Biochemical mechanisms of digestion, absorption and metabolism  
- Transport and storage physiology  
- Agonists and antagonists  
**Clinical Issues of Micromineral Metabolism** |
| 5.   | **Digestion Effects**  
- Nutrients that resist digestion  
- Effects of gut microbiota on digestion, nutrient status and systemic physiology  
- Intolerance and malabsorption syndromes |
| 6.   | **Liver Detoxification**  
- Liver Phase One Pathways  
- Liver Phase Two Pathways  
- Methylation and Homocysteine  
**Alcohol Detoxification** |
| 7.   | **Hormonal Regulation and Types of Energy Metabolism**  
- Relationship between liver and other organs  
**Energy Systems Biochemistry**  
- Glycolysis  
- Krebs cycle and electron transport chain  
- Anaerobic metabolism  
- Glycogenesis and gluconeogenesis |

**NON-TEACHING WEEK** (note that make-up classes may be scheduled in this week)  
**Semester 1** - This aligns with the week after Easter so it may fall between Weeks 6 to 8  
**Semester 2 & Online students** - The non-teaching week falls between Weeks 7 and 8
### 8. Energy Systems Biochemistry (Continued)
- Lipoproteins and fatty acid metabolism
- Cholesterol biosynthesis and regulation of metabolism
- Lipogenesis and lipolysis
- Clinical issues of energy metabolism

### 9. Managing Oxidation
- Free radical generation
- Antioxidants
- Regeneration / redox pathways

### 10. Inflammation
- Essential fatty acids
- The role of prostaglandins, leukotrienes and cytokines
- Nutritional influences on inflammation pathology

### 11. Amino Acid Biochemistry
- Regulation, metabolism and amino transferases
- Waste nitrogen and the urea cycle
- Neurotransmitter synthesis and functions

### 12. Blood Cell Biochemistry
- Haemopoiesis, erythropoiesis, leukopoiesis
  - **Immunity**
    - Gut associated lymphoid tissue
    - Innate immunity
    - Acquired immunity
    - Clinical issues in haematology and immune dysfunction

### 13. Homeostatic Maintenance
- Body fluid, electrolytes and the role of the kidneys
- Acid-base balance and associated disorders
- Regulation of pH

### 14. Non-Teaching Week/Practical Examination Week 1
Note that make-up classes may be scheduled in this week

### 15. Non-Teaching Week/Practical Examination Week 2
Note that make-up classes may be scheduled in this week

### 16. Final Examination Week 1
Please refer to the Examination Timetable for your local campus for the exact day and time of exam

### 17. Final Examination Week 2
Please refer to the Examination Timetable for your local campus for the exact day and time of exam