

## BCMB20003 Biochemical Regulation of Cell Function

| <b>Credit Points:</b>                        | 12.50   |                |                            |                |  |                        |       |         |                            |                |  |            |    |
|--|---|----------------|----------------------------|----------------|--|------------------------|-------|---------|----------------------------|----------------|--|------------|----|
| <b>Level:</b>                                | 2 (Undergraduate)   |                |                            |                |  |                        |       |         |                            |                |  |            |    |
| <b>Dates &amp; Locations:</b>                | This subject is not offered in 2014.  |                |                            |                |  |                        |       |         |                            |                |  |            |    |
| <b>Time Commitment:</b>                      | Contact Hours: three x 1 hour lecture per week and one x 1 hour tutorial per week Total Time Commitment: 48 contact hours with an estimated total time commitment of 120 hours  |                |                            |                |  |                        |       |         |                            |                |  |            |    |
| <b>Prerequisites:</b>                        | <p>For BSc degree:</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>BCMB20002 Biochemistry and Molecular Biology</td> <td>Semester 1, Semester 2</td> <td>12.50</td> </tr> </tbody> </table> <p>This subject may also be taken as a corequisite (i.e. concurrently).</p> <p>For BBiomed degree:</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>BIOM20001 Molecular and Cellular Biomedicine</td> <td>Semester 1</td> <td>25</td> </tr> </tbody> </table> <p>Other combinations of subjects that provide a similar background may be considered by the coordinator.</p>  | Subject        | Study Period Commencement: | Credit Points: | BCMB20002 Biochemistry and Molecular Biology | Semester 1, Semester 2 | 12.50 | Subject | Study Period Commencement: | Credit Points: | BIOM20001 Molecular and Cellular Biomedicine | Semester 1 | 25 |
| Subject                                      | Study Period Commencement:  | Credit Points: |                            |                |  |                        |       |         |                            |                |  |            |    |
| BCMB20002 Biochemistry and Molecular Biology | Semester 1, Semester 2  | 12.50          |                            |                |  |                        |       |         |                            |                |  |            |    |
| Subject                                      | Study Period Commencement:  | Credit Points: |                            |                |  |                        |       |         |                            |                |  |            |    |
| BIOM20001 Molecular and Cellular Biomedicine | Semester 1  | 25             |                            |                |  |                        |       |         |                            |                |  |            |    |
| <b>Corequisites:</b>                         | Refer to prerequisite details.  |                |                            |                |  |                        |       |         |                            |                |  |            |    |
| <b>Recommended Background Knowledge:</b>     | <p>Level 1 Biology is strongly recommended.<br/>A biomedical or biological practical subject such as</p> <table border="1"> <thead> <tr> <th>Subject</th> <th>Study Period Commencement:</th> <th>Credit Points:</th> </tr> </thead> <tbody> <tr> <td>BCMB20005 Techniques in Molecular Science</td> <td>Semester 1, Semester 2</td> <td>12.50</td> </tr> </tbody> </table> <p>or equivalent is strongly recommended.</p>   | Subject        | Study Period Commencement: | Credit Points: | BCMB20005 Techniques in Molecular Science    | Semester 1, Semester 2 | 12.50 |         |                            |                |  |            |    |
| Subject                                      | Study Period Commencement:  | Credit Points: |                            |                |  |                        |       |         |                            |                |  |            |    |
| BCMB20005 Techniques in Molecular Science    | Semester 1, Semester 2  | 12.50          |                            |                |  |                        |       |         |                            |                |  |            |    |
| <b>Non Allowed Subjects:</b>                 | Students cannot enrol in and gain credit for this subject if previously obtained credit for pre-2009 subject Biochemistry and Molecular Biology Part A or Biochemistry and Molecular Biology Part B.  |                |                            |                |  |                        |       |         |                            |                |  |            |    |
| <b>Core Participation Requirements:</b>      | <p>&lt;p&gt;For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry.&lt;/p&gt; &lt;p&gt;It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: &lt;a href="http://services.unimelb.edu.au/disability"&gt;http://services.unimelb.edu.au/disability&lt;/a&gt;&lt;/p&gt;</p> |                |                            |                |  |                        |       |         |                            |                |  |            |    |
| <b>Contact:</b>                              | <p>Subject Coordinator<br/>Dr Irene Stanley<br/><a href="mailto:i.stanley@unimelb.edu.au">i.stanley@unimelb.edu.au</a> (mailto:i.stanley@unimelb.edu.au)<br/>Administrative Coordinator<br/>Ms Irene Koumanelis</p>   |                |                            |                |  |                        |       |         |                            |                |  |            |    |

|                           |   |
|---------------------------|---|
|                           | <b><a href="mailto:i.koumanelis@unimelb.edu.au">i.koumanelis@unimelb.edu.au</a> (mailto:i.koumanelis@unimelb.edu.au)</b>  |
| <b>Subject Overview:</b>  | This subject investigates the molecular mechanisms by which cells regulate their replication, function and metabolism, i.e. the essential properties of living organisms. Subject content includes an introduction to biomembranes, that create the intracellular environment and allow specific functions such as the transport of molecules and secretion of proteins. An introduction to signal transduction considers the action of hormones and cytokines that allow different cells to respond appropriately to their extracellular environment. Extracellular signals are transmitted from membrane receptors via intracellular signalling pathways to the nucleus to drive controlled expression of genes and synthesis of proteins required for cell function and metabolism, cell division (cell cycle) or cell death (apoptosis). The role of the cytoskeleton in allowing cells to maintain their shape, to migrate and to transport molecules is investigated. Nutrition and metabolism explores the dual roles of diet in providing energy and structural precursors to maintain human health. Core energy pathways relating to carbohydrate, protein and lipid metabolism will be investigated as a means of generating energy. The crucial role of cholesterol in health and disease will be considered. Hormonal regulation of metabolism critical for health and disease and the adaptations observed in fasting, starvation and in athletes will be covered. The light and dark reactions of photosynthesis are described to show how carbohydrates are made from carbon dioxide, using the energy of the sun. This elegant biochemical process is fundamental to human existence. |
| <b>Learning Outcomes:</b> | By the end of the subject the student should understand the following: <ul style="list-style-type: none"> <li># The structure and function of biomembranes e.g. in transporting molecules into or out of the cell and in protein secretion.</li> <li># Cellular processes including cell function, cell cycling (cell division) or apoptosis as the outcome of controlled gene expression, regulated by factors within and external to cells and communicated by signal transduction molecules.</li> <li># The cytoskeleton and cytoskeletal proteins that allow cells to maintain their shape, to migrate and to transport molecules within the cell.</li> <li># The dual role of diet in providing energy and structural precursors for cells and to maintain human health.</li> <li># Core metabolic pathways for carbohydrates and proteins by which cells generate ATP.</li> <li># Signal transduction, including the action of hormones regulating metabolic pathways are critical to health and disease.</li> <li># Photosynthesis as the crucial means by which plants generate carbohydrates from carbon dioxide, using the energy of the sun.</li> </ul>  |
| <b>Assessment:</b>        | 3 hour exam held in the University examination period: 70%, 2 x intrasemester test during semester (10% each): 20%, Computer-based continuous assessment during semester:10%  |
| <b>Prescribed Texts:</b>  | Nelson and Cox, Lehninger Principles of Biochemistry, 6th edn., 2013  |
| <b>Breadth Options:</b>   | This subject potentially can be taken as a breadth subject component for the following courses: <ul style="list-style-type: none"> <li># <b>Bachelor of Arts</b> (<a href="https://handbook.unimelb.edu.au/view/2014/B-ARTS">https://handbook.unimelb.edu.au/view/2014/B-ARTS</a>)</li> <li># <b>Bachelor of Commerce</b> (<a href="https://handbook.unimelb.edu.au/view/2014/B-COM">https://handbook.unimelb.edu.au/view/2014/B-COM</a>)</li> <li># <b>Bachelor of Environments</b> (<a href="https://handbook.unimelb.edu.au/view/2014/B-ENVS">https://handbook.unimelb.edu.au/view/2014/B-ENVS</a>)</li> <li># <b>Bachelor of Music</b> (<a href="https://handbook.unimelb.edu.au/view/2014/B-MUS">https://handbook.unimelb.edu.au/view/2014/B-MUS</a>)</li> </ul> <p>You should visit <a href="http://breadth.unimelb.edu.au/breadth/info/index.html">learn more about breadth subjects (http://breadth.unimelb.edu.au/breadth/info/index.html)</a> and read the breadth requirements for your degree, and should discuss your choice with your student adviser, before deciding on your subjects.</p>  |
| <b>Fees Information:</b>  | Subject EFTSL, Level, Discipline & Census Date, <a href="http://enrolment.unimelb.edu.au/fees">http://enrolment.unimelb.edu.au/fees</a>   |
| <b>Generic Skills:</b>    | On completion of this subject, students should have developed the following generic skills: <ul style="list-style-type: none"> <li># think critically and organise knowledge, from consideration of the lecture material;</li> <li># learn to adopt new ideas from participation in the lecture and tutorial programs; and</li> <li># plan effective work schedules and grow more confident in the synthesis of knowledge.</li> </ul>   |

|  |   |
|--|---|
| <b>Notes:</b>                                      | This subject is available for science credit to students enrolled in the BSc (both pre-2008 and New Generation degrees), BAsC or a combined BSc course.<br>Not available to students enrolled in the Bachelor of Biomedicine.<br>Students undertaking this subject will be expected to regularly access an internet-enabled computer. |
| <b>Related Majors/Minors/<br/>Specialisations:</b> | Science credit subjects* for pre-2008 BSc, BAsC and combined degree science courses<br>Science-credited subjects - new generation B-SCI and B-ENG.<br>Selective subjects for B-BMED   |