



**Health and Sports Science Module Handbook**  
**Faculty of Sports Science Universitas Negeri Makassar**

<b>Module designation</b>		<b><i>Sport Biochemistry</i></b>				
Semester(s) in which the module is taught		1				
Person responsible for the module		Dra. Ichsani, M.Kes				
Language		Bilingual (Bahasa and English)				
Relation to curriculum		Compulsory				
Teaching methods		3 parallel classes consist of 35 students/class: 1) Lecture (Face to face lecture): 3 hours x 14 weeks 2) Practical class: -				
Workload	Total workload	130 hours				
		Face to face teaching	Structured activities	Independent study	Exam	total
	Lecture	42	42	42	4	130
	Practical class	-	-	-	-	-
	Total					130
Credit points		3 credits				
Required and recommended prerequisites for joining the module		Physiology				



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<p>Module objectives/intended learning outcomes</p>	<p>In this course, students will learn about the major metabolic pathways associated with the transport and storage of substrate, and production of “energy equivalents” at rest and during different durations and intensities of exercise, as well as in other physiological or clinical conditions. Upon completion of this course students will be able to:</p> <ol style="list-style-type: none"><li>1. demonstrate an understanding of energy transfers and energy storage in the body.</li><li>2. understand the concept of basic biochemical concepts and principles in biomolecules and metabolism.</li><li>3. describe and explain the role of enzymes in metabolic pathways, and the different mechanisms by which they are regulated.</li><li>4. understand the mechanisms related to acid-base control during exercise.</li><li>5. understand metabolic interactions amongst muscle and other tissue and organ systems.</li><li>6. understand and able to apply the concept of physiology linking to basic biomolecules (proteins, enzymes, carbohydrates, and fats).</li><li>7. understand the relationship between metabolism and certain disease states.</li><li>8. describe and explain the relationship between metabolism and exercise performance.</li></ol>
<p>Content</p>	<ul style="list-style-type: none"><li>• Amino acid, peptides, and proteins (the nature of amino acids, characteristics of peptides, structure of proteins).</li><li>• Enzymes (enzymes as catalysts, rates of enzymatic reactions, enzyme inhibition, regulation of enzyme activity, provision of reactive groups by cofactors, oxidations and reductions).</li><li>• Energy systems and bioenergetics (free energy, energy-rich phosphates, energy systems).</li><li>• Carbohydrate and related metabolism (carbohydrates, cellular uptake of glucose, phosphorylation of glucose, glycolysis, glycogen metabolism).</li><li>• Metabolism during exercise: Fat versus carbohydrate.</li><li>• Amino Acid and Protein Metabolism (overview, degradation of amino acids, urea cycle, fate of amino acid carbon skeletons, amino acid metabolism in exercise).</li></ul>



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<p>Exams and assessment formats</p>	<p><b>Assignments</b> Students working in groups (3 – 4 students) will do a presentation on one of the lecture topics. There will be Q&amp;A session following the students' presentation.</p> <p><b>Weight:</b> 30%</p> <p><b>Exams</b> There will be two exams during the semester: mid semester exam and final semester exam. Exams will be a combination of multiple choice, filling-the-blank, matching, and/or short answer questions.</p> <p><b>Weight:</b> 35% for Mid Exam and 35% for Final Exam.</p>
<p>Study and examination requirements</p>	<p>Students are expected to attend all classes, unless circumstances prevent them from attending and an email was sent prior to class. Final grading will be based on students' attendance, their participation in group assignments, and their scores in mid and final exams.</p>
<p>Reading list</p>	<p>Tiidus, P. M., Tupling, A.R., &amp; Houston, M. E. (2012). Biochemistry Primer for Exercise Science, 4th Edition. Human Kinetics.</p> <p>McKee, J. R., &amp; McKee T. (2015). Biochemistry: The Molecular Basis of Life, 6<sup>th</sup> Edition. Oxford University Press.</p> <p>Lieberman, M. A., &amp; Peet, A. (2017). Marks' Basic Medical Biochemistry: A Clinical Approach, 5<sup>th</sup> Edition. Wolters Kluwer.</p>