

# University of Pretoria Yearbook 2021

## Macromolecules of life: structure-function and bioinformatics 356 (BCM 356)

<b>Qualification</b>	Undergraduate
<b>Faculty</b>	<a href="#">Faculty of Natural and Agricultural Sciences</a>
<b>Module credits</b>	18.00
<b>NQF Level</b>	07
<b>Programmes</b>	<a href="#">BSc Biochemistry</a>
	<a href="#">BSc Biotechnology</a>
	<a href="#">BSc Chemistry</a>
	<a href="#">BSc Entomology</a>
	<a href="#">BSc Genetics</a>
	<a href="#">BSc Human Genetics</a>
	<a href="#">BSc Human Physiology</a>
	<a href="#">BSc Microbiology</a>
	<a href="#">BSc Nutrition</a>
	<a href="#">BSc Plant Science</a>
	<a href="#">BSc Zoology</a>
<b>Prerequisites</b>	BCM 251 GS and BCM 257 GS and BCM 261 GS and BCM 252 GS.
<b>Contact time</b>	1 practical/tutorial per week, 2 lectures per week
<b>Language of tuition</b>	Module is presented in English
<b>Department</b>	Biochemistry, Genetics and Microbiology
<b>Period of presentation</b>	Semester 1

## Module content

Structure, function, bioinformatics and biochemical analysis of (oligo)nucleotides, amino acids, proteins and ligands – and their organisation into hierarchical, higher order, interdependent structures. Principles of structure-function relationships, protein folding, sequence motifs and domains, higher order and supramolecular structure, self-assembly, conjugated proteins, post-translational modifications. Molecular recognition between proteins, ligands, DNA and RNA or any combinations. The RNA structural world, RNAi, miRNA and ribosomes. Cellular functions of coding and non-coding nucleic acids. Basic principles of mass spectrometry, nuclear magnetic resonance spectroscopy, X-ray crystallography and proteomics. Protein purification and characterisation including, pI, molecular mass, amino acid composition and sequence. Mechanistic aspects and regulation of information flow from DNA via RNA to proteins and back. Practical training includes hands-on nucleic acid purification and sequencing, protein production and purification, analysis by SDS-PAGE or mass spectrometry, protein structure analysis and 3D protein modelling.

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