

<b>Module code</b>	SC-4368		
<b>Module Title</b>	Biosensors Biochips and Nanobiotechnology		
<b>Degree/Diploma</b>	Bachelor of Science (Chemistry)		
<b>Type of Module</b>	Major Option		
<b>Modular Credits</b>	4	<b>Total student Workload</b>	10 hours/week
		<b>Contact hours</b>	2 hours/week
<b>Prerequisite</b>	None		
<b>Anti-requisite</b>	None		
<b>Aims</b>			
To acquire in-depth knowledge, analysis and competence of various biosensing, biochips and nanobiotechnology platforms. The module will also be introduced with laboratory demonstration/hands-on experiment.			
<b>Learning Outcomes</b>			
<i>On successful completion of this module, a student will be expected to be able to:</i>			
Lower order:	40%	- Understand the overall theory and applications of biosensors, biochips and nanobiotechnology approaches	
Middle order:	40%	- Investigate critical components of assay/protocol development of different diagnostics depending on their application	
Higher order:	20%	- Innovating parallel bio- and nanotechnological tool development - Student-centred pedagogy through entrepreneurship and commercialization	
<b>Module Contents</b>			
- <i>Introduction:</i> Definition, history of Biosensors, Biochips and Nanobiotechnology etc,			
- <i>Recognition receptors for biosensors:</i> Nucleic acids (DNA/RNA), aptamers, enzymes/proteins, etc.			
- <i>Biosensor modification and treatment:</i> Entrapment, encapsulation, and cross-linking etc.			
- <i>Detection methods and signal processing:</i> Electrochemical, optical, magnetic, labels etc.			
- <i>Biosensor design and fabrication:</i> Screen-printing, photolithography, BioMEMS, Nanomaterials.			
- <i>Sample processing and pre-treatment:</i> Food (Raw and processed); Bio specimens i.e. blood, cell, urine, saliva, tissues, etc. Microorganisms, toxin and heavy metals.			
- <i>Point of care (POC) devices:</i> Microfabrication, lab-on-a-chip, microfluidics etc			
- <i>Application of biosensors and future commercialization outlook:</i> Healthcare, food security, Halal foods detection, environmental and process industries, security and defence etc.			
<b>Assessment</b>	Formative assessment	Tutorial and feedback	
	Summative assessment	Examination: 60%	
		Coursework: 40%	
		- 3 practical reports (20%)	
		- 2 written assignments (10%)	
		- 2 class tests (10%)	