

<b>Module Title:</b>	Molecular Genetics and Immunology 2
<b>Language of Instruction:</b>	English
<b>Credits:</b>	5
<b>NFQ Level:</b>	8
<b>Module Delivered In</b>	<a href="#">1 programme(s)</a>
<b>Teaching &amp; Learning Strategies:</b>	This module will be taught in three theory classes, of one hour each, per week. Timetabling will also accommodate tutorial/practical classes of one hour per week. Relevant class notes, diagrams and self assessment tools will be available at the Institute's student common drive.
<b>Module Aim:</b>	The aim of this module is to give students a functional competency in the theoretical knowledge and the methods of molecular genetics, biotechnology and immunology.
<b>Learning Outcomes</b>	
<i>On successful completion of this module the learner should be able to:</i>	
LO1	Discuss the mammalian immune response with respect to antibody production and vaccine efficacy.
LO2	Explain the basis of antibody and antigen reactions and demonstrate how this interaction can be commercially exploited.
LO3	Evaluate the production of monoclonal and polyclonal antibodies, their current and potential commercial roles and their industrial, environmental and therapeutic application.
<b>Pre-requisite learning</b>	
<b>Module Recommendations</b> <i>This is prior learning (or a practical skill) that is recommended before enrolment in this module.</i>	
No recommendations listed	
<b>Incompatible Modules</b> <i>These are modules which have learning outcomes that are too similar to the learning outcomes of this module.</i>	
No incompatible modules listed	
<b>Co-requisite Modules</b>	
No Co-requisite modules listed	
<b>Requirements</b> <i>This is prior learning (or a practical skill) that is mandatory before enrolment in this module is allowed.</i>	
No requirements listed	

## Module Content & Assessment

### Indicative Content

#### Immunology

Mammalian immune response: Overview of the mammalian immune response with respect to antibody production and vaccine efficacy. Antigens and immunogens. Antibody and antigen reactions in vivo and in vitro. Antibody affinity and avidity. Structure and properties of immunoglobulins, overview of main isotypes, source of antibody diversity. Commercial antibody production: Polyclonal and monoclonal antibody production. Large-scale antibody production. Antibody purification methods. Applications of antibody and antigenic reactions, kits, monoclonal antibodies in detection, diagnostics and therapy. Vaccines: Immunization: passive and active. Vaccine production and development with respect to problems associated with human vaccines.

#### Practical

Practical's will be delivered as tutorials focusing on problem solving and assisting the student in the interpretation and analysis of molecular data generated through modern molecular techniques including; qPCR, Microarray analysis, Southern hybridization analysis, Eliza, Restriction digests, Primer/probe design and optimization, Manipulation of raw sequence data via bioinformatic tools, Sequencing and DNA fingerprinting. Above techniques will be adopted and substituted as appropriate. In addition to the tutorials students will be asked to review, summarise and present key research papers and current developments in topics encountered during the course of study. Material and presentations generated will be assessed on an ongoing basis.

Assessment Breakdown	%
Practical	40.00%
End of Module Formal Examination	60.00%

### Special Regulation

Learners are required to achieve a minimum mark (35%) in both practical and Final Exam

No Continuous Assessment

No Project

### Practical

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Practical/Skills Evaluation	practical work sheets and paper reviews	1,2,3	40.00	n/a

### End of Module Formal Examination

Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Formal Exam	Final examination of three hour duration	1,2,3	60.00	End-of-Semester

SETU Carlow Campus reserves the right to alter the nature and timings of assessment

**Module Workload**

<b>Workload: Full Time</b>		
<i>Workload Type</i>	<i>Frequency</i>	<i>Average Weekly Learner Workload</i>
Lecture	12 Weeks per Stage	3.00
Laboratory	12 Weeks per Stage	1.00
Estimated Learner Hours	12 Weeks per Stage	6.42
Total Hours		125.00

**Module Delivered In**

Programme Code	Programme	Semester	Delivery
CW_SABTP_B	<a href="#">Bachelor of Science (Honours) in Biosciences with Biopharmaceuticals</a>	8	Mandatory