

**CNWX40090 Introduction to ‘Omics’ and Advanced Imaging Technologies**  
**REVISED MODULE DESCRIPTOR (’08/09)**

<b>Title</b>	Introduction to ‘omic’ and advanced imaging technologies
<b>Code</b>	CNWX40090 [previously CNWX40040]
<b>Credits</b>	5
<b>Semester</b>	2
<b>Level</b>	4
<b>Co-ordinator</b>	Clare O’Connor
<b>Contributors</b>	Bioinformatics: Peadar O Gaora Proteomics: Dolores Cahill & Mike Dunn Genomics: Sean Ennis Transcriptomics: Jacintha O’Sullivan Imaging: Orina Belton & Ann Hopkins Diagnostic Imaging: Kathleen Curran
<b>Module Places</b>	Places will be limited to the number of computer laboratory spaces available for the Bioinformatics practical session
<b>Module Dependencies</b>	NONE
<b>Indicative Module Descriptor:</b>	
<p>This course is designed to familiarise students with the principles, practice and application of the rapidly developing ‘omic’ and imaging technologies. It will comprise 10x3hr seminar-style sessions covering</p> <ul style="list-style-type: none"> <li>o Bioinformatics (2 sessions, the second session to encompass hands-on application of bioinformatic approaches)</li> <li>o Proteomics (2 sessions)</li> <li>o Genomics and transcriptomics (2 sessions)</li> <li>o Imaging – from cell to person (4 sessions)</li> </ul>	
<b>Indicative Learning Outcomes</b>	
<p>On completion of the course the students should:</p> <p><i>Bioinformatics:</i> Understand what Bioinformatics is – and is not; be familiar with sequence formats, databases and associated query tools; be aware of complete genome projects and resources and how to access these resources; be familiar with the application of homology searching and multiple sequence alignment</p> <p><i>Proteomics:</i> Be familiar with the separation methods applied in proteomics, including 2D gel electrophoresis and chromatographic techniques; understand the use of Mass Spectrometry instruments and methods in proteomic analysis; be aware of the bioinformatic approaches and computer software used for proteomic data analysis; know about the use of protein expression systems, including protein and antibody arrays, and their biomedical applications</p> <p><i>Genomics:</i> Be familiar with the principals of Genomics, the construction of genome maps, genome sequencing and genomic variation; understand the application of genomics to trait and disease identification, diagnostics and personalised medicine; be familiar with emerging technological advances and bioinformatics in genomics</p> <p><i>Transcriptomics:</i> Have a general understanding of Transcriptomics, regulation of the transcriptome and the use of microarray technologies, including their advantages and disadvantages; be familiar with the bioinformatic approaches and software used in microarray analysis and with microarray data sharing in the Life Sciences, be aware of the application of transcriptome profiling in diagnostics and pharmacogenomics and the challenges it presents for the future</p> <p><i>Advanced Imaging technologies:</i> Understand the innovation and advances in current imaging technologies and the relevance and importance of the basic principles of imaging to the most widely used technologies for <i>in vitro</i>, <i>in vivo</i> and diagnostic research; appreciate the cell biological tools available for morphologic localization of <i>in vitro</i> structures and understand how confocal and electron microscopy facilitates basic and translational research; be familiar with the applications of <i>in vivo</i> imaging technologies to animal models of human disease and the limitations and advantages of currently used technologies, have a comprehensive understanding of the most recent technologies for whole organism imaging, be familiar with the principals and applications of the major diagnostic imaging technologies used in medical practice, including CT, MRI and PET scanning</p>	
Workload:	100
Seminars	30
Specified activities	40
Autonomous Student learning	30

Assessment:	Type	%	timing
Online Bioinformatic exercise		20%	
MCQ		80%	Semester 2
<p>Specified Activities:</p> <ul style="list-style-type: none"> <li>○ Prior to each seminar students are required to read and be prepared to discuss recent reviews on the development and application of the technologies covered in the seminar (36)</li> <li>○ Students are required to carry out an online Bioinformatic exercise which forms part of the module assessment (4)</li> </ul> <p>Assessment: Online Bioinformatics exercise and in-house MCQ</p>			