



CORPORATE AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data					
Module Title	Current Issues in Biomedical Sciences				
Module Code	USSKL3-30-M	Level	M	Version	1
Owning Faculty	Health and Life Sciences	Field	Applied Sciences		
Contributes towards	MSc Biomedical Science (compulsory on all routes)				
	30	ECTS Credit Rating	15	Module Type	Standard
Pre-requisites			Co- requisites		
Excluded Combinations			Module Entry requirements		
Valid From	Sept 2012		Valid to	September 2018	
CAP Approval Date	30 th May 2012				

Part 2: Learning and Teaching	
Learning Outcomes	<p>On successful completion of this module students will be able to:</p> <ul style="list-style-type: none"> critically appraise current literature on the nature of disease processes in terms of molecular, biochemical, immunological, microbiological and pharmacological interactions discuss critically the role of research in furthering knowledge and understanding of physiology pathophysiology, and treatment of a variety of conditions discuss critically the role of research in furthering knowledge and understanding of physiology and pathophysiology of ageing. discuss the principles and advantages/disadvantages of a variety of analytical techniques used in the biomedical sciences to develop further skills in written and oral communication relevant to biology of disease demonstrate an independent learning style which will be of value well beyond the confines of this award. utilise electronic information sources effectively as learning aids. <p>All learning outcomes are assessed by the combination of the research critique and the related presentation – the processing and analysing of the information acquired occurs for both pieces of work though the mode of presentation of the material is by two complementary methods that draw on different skills.</p>
Syllabus Outline	<p>The module contains 16 h '<i>Methods for Clinical Scientist</i>' lectures which helps students to comprehend and critically analyse research findings published in the literature. This includes three core technology relevant to all students reading for MSc in Biomedical Sciences. 1. <i>Molecular biology</i> (3h) (Isolation of nucleic acids, DNA extraction from bacteria, DNA extraction from animal cells, Isolation and purification of RNA, Restriction enzymes, Gel electrophoresis, DNA sequencing, Southern blotting, RFLP, In situ hybridisation, Recombinant DNA, Polymerase chain reaction, Reverse transcriptase PCR, Real-time PCR, DNA microarray); 2. <i>Electrophoresis (1h)</i> (Principles, Polyacrylamide, Agarose, Capillary, Isoelectric focusing); 3. <i>Microscopy (2h)</i> (Transmitted light microscopy, Dark field, Phase contrast, Fluorescence,</p>

	<p>Confocal, Inverted, Electron, Optical tweezers, Digital imaging and processing (empty magnification/image manipulation).</p> <p>Students also learn methods that are relevant for their specialism. These are delivered as specialist methods such as 1. <u>Immunohistochemistry, immunocytochemistry, in-situ hybridisation (2h)</u> (Cellular Pathology, Haematology, Applied Immunology); 2. <u>Immunoassays (2h)</u> (Latex immunoassay, Immunonephelometry, Radioimmunoassay, ELISA - Haematology, Clinical Biochemistry, Applied Immunology); 3. <u>Flow cytometry (1h)</u> (Cell cycle, DNA content analysis, T cell subset analysis & enumeration, Immunophenotyping – Leukaemia and lymphoma analysis, Stem cell enumeration, Use of biomarkers for diagnosis & prognosis (surface & internal biomarker staining), Cell sorting -stem cells, sperm (Haematology, Applied Immunology). 4. <u>Spectroscopy (2h)</u> (Mass spectrometry, MALDI-TOF - Clinical Biochemistry, Haematology, Medical Bacteriology, Applied Immunology); 5. <u>Chromatography (1h)</u> (High performance liquid chromatography, Gas-liquid chromatography, Two-dimensional - Clinical Biochemistry, Haematology); 6. <u>Point of care testing (2h)</u> (Standards and guidelines, Advantages and limitations, Evaluating a POCT device, Use of POCT devices, Quality and POCT, Technical or analytical validation (limits of linearity, analytical specificity and sensitivity, accuracy, precision), Clinical evaluation and validation - Clinical Biochemistry, Medical Bacteriology, Haematology, Applied Immunology).</p> <p>The module contains a 20 h ‘<i>Current Issues in Biomedical Research</i>’ topic. The topics selected will reflect current advances and concerns in biomedical sciences and will provide sufficient knowledge to understand and review the current scientific literature in this field. These topics are current priority areas of the Medical Research Council, The Wellcome Trust, BBSRC, DiabetesUK, Alzheimer’s Society or the British Heart Foundation. The following is an indicative, but not exhaustive list of the type of topics available for selection as appropriate to the award.</p> <p>1. Technology development for bioscience – Biosensors. 2. Recent development in Type 1&2 Diabetes mellitus research. 3. Recent development in Obesity research. 4. Recent advances in cancer research. 5. The impact of tissue micro array (TMA) technology on biomedical research. 6. Early diagnosis of cancer (cancer imaging, biomarkers, discovery and development of anticancer drugs, genetic testing) 7. Neurodegeneration, 8. Stem cell plasticity; 9. Haematological cancers; 10. The replacement, refinement and reduction (3Rs) in research using animals; 11. Data driven biology – analysis of next generation sequencing, capturing variation and linking biological processes through to phenotypic traits; 12. Healthy and safe food; 13. Clinical translational research – breath gas analysis; 14. Asthma (Genetics, early life events and development of asthma, environment and lifestyle influences on asthma, infection, immunity and their effects on asthma); 15. Vaccine research; 16. Antimicrobial resistance; 17. Dementia – Alzheimer disease (cause – genetics, cellular mechanism, vascular disease, cure- drug development, stem cells, vaccines, prevention – long term epidemiological studies, treatment for high blood pressure).</p>
<p>Contact Hours/Scheduled Hours</p>	<ul style="list-style-type: none"> • Students will have 16 h <i>Methods for Clinical Scientist</i> lectures and 20 h ‘<i>Current Issues in Biomedical Research</i>’ lectures. (36h) • They will have a 2h seminar to understand the module and requirements. They will have a 2h seminar or literature search, referencing; 2h seminar on writing a critical review, 2h seminar on preparing oral presentations, 2X2h one to one feed-back session following both assignments. (12h) • They will have laboratory demonstration on microscopy (2h), flow cytometry (2h), mass spectroscopy (1h), chromatography (1h), biosensors (2h). (8h) • Students will have a tutorial (2h) to use the 3-D Virtual genetics laboratory in Second Life and this will be available for them during the run of the module. Problem solving tools (similar to that of the Second Life) will be used to assess student’s comprehension on the clinical methods (3x2h). (8h) • There will be 8x1h time-tabled one to one sessions with the module leader when students can discuss specific issues related to the assignments, module content, problem solving assessment. (8h) • A further period of contact time will occur when students listen to each others’ presentations (dependent on number of students in a cohort) – all students are expected to attend all presentations and actively partake in the asking of questions.

<p>Teaching and Learning Methods</p>	<p>This module adopts a student-centred approach which encourages and facilitates the adoption of an independent, self-directed learning style. It will be delivered as a series of key note lectures, tutorials, practical demonstrations of equipment, and by the use of computer assisted learning packages. Students will have a tutorial to use the 3-D Virtual genetics laboratory in Second Life (in collaboration with University of Leicester) and this will be available for them during the run of the module. This is an Internet-based simulated environment that will enhance the effectiveness of real-life laboratory work. Second Life enables students to explore, experiment and evaluate situations in risk-free interactive ways within the virtual laboratory. Problem solving tools (similar to that of the Second Life) will be developed to assess student's comprehension on the clinical methods. Each lecture or tutorial will include explicit Aims and Learning Outcomes, explanation of Key Concepts, a guide to sources of both paper-based and electronic information. Lectures/tutorials will be delivered by experts in each particular topic. Communication between students and academics staff will be fostered using online facilities and a bulletin board.</p>
<p>Reading Strategy</p>	<p>At Masters level students are expected to demonstrate the ability to find information, assess its relevance and utilise it in their studies in an independent manner; however the programme team recognise that students entering the programme may be at different levels of the development of the skills required to undertake this successfully. Therefore module leaders will provide you with a starting point in terms of core readings and the lecture material will also give you a strong starting point. However it is in the area of further reading that you need to show the independence of skills and of knowledge development, so you will need to find the Further Readings yourself. However, the skills required to do this are covered during the early stages of the course, during induction week you will have a library induction session, in the Research Methods and Practical Skills module that you take during the first semester we will cover how to undertake a literature search and how to assess and use the material you find appropriately. The programme tutorials will provide opportunities for you to further develop these skills and to ask any questions that you have. Further support and guidance is available through the library which runs workshops that you can sign up to, and also has advice in its website.</p> <p>Module leaders will give you a clear indication of any essential reading, and point you towards the appropriate textbooks and journals for their discipline. This will usually be in the form of a reading list in the module guide; the indicative list on this module specification is as it states indicative as the relevant available books and journals can change regularly – and the module specification is a document written only once when a module is modified and can last for many years. So it is important that you refer to the reading list for your specific year group as the definitive document.</p> <p>All students will be encouraged to make full use of the print and electronic resources available to them through membership of the University. These include a range of electronic journals and a wide variety of resources available through web sites and information gateways. The University Library's web pages provide access to subject relevant resources and services, and to the library catalogue. Many resources can be accessed remotely.</p>
<p>Indicative Reading List</p>	<p>Textbooks- current editions of</p> <ul style="list-style-type: none"> • "Biomedical Science Practice, Experimental and Professional Skills", Glencross H., Ahmed N. & Wang Q. (eds). (Oxford University Press) • "Biomedical Sciences, Essential Laboratory Medicine" Iles R.K. & Socherty S.M. (Wiley-Blackwell) • "Clinical Biochemistry" (Fundamentals of Biomedical Science Series) Ahmed N. (ed) (Oxford University Press) • "Haematology" (Fundamentals of Biomedical Science Series) Moore G., Knight G., & Blann A. (ed) (Oxford University Press) • "Medical Microbiology" (Fundamentals of Biomedical Science Series) Ford M. (ed) (Oxford University Press) • "Immunology" (Fundamentals of Biomedical Science) Hall A. & Yates C. (eds) (Oxford University Press)

	<ul style="list-style-type: none"> • “Histopathology” (Fundamentals of Biomedical Science Series) Orchard G. & Nation B. (eds) (Oxford University Press) • “Cytopathology” (Fundamentals of Biomedical Science Series) Shambayati B. (ed) (Oxford University Press) • “Transfusion and Transplantation Science” (Fundamentals of Biomedical Science Series) Knight R. (ed) (Oxford University Press) • “Biology of Disease” (Fundamentals of Biomedical Science Series) Gibbs R. & Heugh S. (eds) (Oxford University Press) <p>Web sites: The National Center for Biotechnology Information (NCBI) advances science and health by providing access to biomedical and genomic information - http://www.ncbi.nlm.nih.gov/pubmed The Institute of Biomedical Science (IBMS) - http://www.ibms.org/ http://www.bized.co.uk/reference/studyskills/index.htm Health Professions Council - http://www.hpc-uk.org/ Human tissue authority - http://www.hta.gov.uk/ Medicines and Healthcare products Regulatory Agency - http://www.mhra.gov.uk The Royal College of Pathologists' website - http://www.rcpath.org/</p>
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Part 3: Assessment

Assessment Strategy	<p>Coursework as decided by the module leader in line with the programme assessment strategy.</p> <p>Students will be assessed on their knowledge of the core and specialism specific methods using a Virtual Software. This will be a formative, informal assessment with feed-back.</p> <p>Summative assessment will be as detailed in the matrix that follows.</p>
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Identify final assessment component and element	Oral Seminar	
% weighting between components A and B (Standard modules only)	A:	B:
	50	50

First Sit	
Component A (controlled conditions) Description of each element	Element weighting (as % of component)
1. Oral Seminar – final assessment	100
Component B Description of each element	Element weighting (as % of component)
1. Research Critique	100

Resit (further attendance at taught classes is not required)	
Component A (controlled conditions) Description of each element	Element weighting (as % of component)
1. Written version of oral seminar	100
Component B Description of each element	Element weighting (as % of component)
1. Research critique	100
If a student is permitted an EXCEPTIONAL RETAKE of the module the assessment will be that indicated by the Module Description at the time that retake commences.	