



CORPORATE AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data					
Module Title	Scientific Measurement				
Module Code	USSJT9-30-2	Level	2	Version	1
Owning Faculty	Health and Applied Sciences	Field	Biological, Biomedical and Analytical Sciences		
Contributes towards	FdSc Healthcare Science				
UWE Credit Rating	30	ECTS Credit Rating	15	Module Type	Standard
Pre-requisites	USSJT6-30-1 Principles in Healthcare Science	Co- requisites	None		
Excluded Combinations	None	Module Entry requirements	n/a		
Valid From	Sept 2013	Valid to	ongoing		

<b>CAP Approval Date</b>	21 <sup>st</sup> November 2012
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Part 2: Learning and Teaching	
Learning Outcomes	<p>This module provides the trainee with opportunities to cover and apply fundamental scientific research and development principles in the context of their programme functional categories. Additionally, they will undertake a basic research and development project, as well as take part in activities relating to audit and continuous improvement of service.</p> <p>Trainees will also put into practice effective study skills, including the use of reflective practice.</p> <p>On successful completion of this module students will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand the principles underpinning scientific research and evidence-based practice [A, B]</li> <li>2. Understand statistical techniques and their correct application [A, B]</li> <li>3. Participate in research and development projects to explore innovations in Healthcare Science [B2]</li> <li>4. Have an awareness of how to protect the well-being and rights of the participants in evidence-based R&amp;D [A, B]</li> <li>5. Conduct a review of scientific literature on an agreed topic [B1]</li> <li>6. Understand and/or participate in audit activities in healthcare science [A/B]</li> </ol>
Syllabus Outline	<ul style="list-style-type: none"> <li>• <b>The scientific method and experimental design:</b> framing and testing hypotheses; planning and executing experiments; blocking and factorial experiments; collection, analysis and interpretation of data.</li> </ul>

	<ul style="list-style-type: none"> <li>• <b>Sources of measurement error/variation:</b> biological variation; technical, systematic and random errors; measuring variation.</li> <li>• <b>Concepts in measurement:</b> precision, accuracy and sensitivity; normal ranges; outliers; false positives/negatives.</li> <li>• <b>Relationships between variables:</b> simple, multiple, linear and non-linear regression analysis; correlation.</li> <li>• <b>Comparing populations:</b> paired and unpaired t-tests; Mann Whitney U and Wilcoxon tests; one- and two-way analysis of variance.</li> <li>• <b>Comparing frequencies:</b> Chi-squared goodness-of-fit and contingency.</li> <li>• <b>Qualitative methods:</b> Basis, aims and comparison to quantitative; participant observation, In-depth interviews, and focus groups.</li> <li>• <b>Audit in Healthcare Science:</b> Principles and practice.</li> <li>• <b>Data retrieval, analysis and presentation:</b> 'on-line' searches, including online journals/Google Scholar; use of computer packages (Excel, Mintab, GraphPad Prism, Word) for the analysis of data and the production of 'publication quality' tables, figures, posters and reports.</li> <li>• <b>Scientific communication:</b> Methods, style and structure.</li> </ul>
Contact Hours	<p>Students enrolled on this module will engage in 6hrs of on-campus learning in each week of the blocks throughout the year, which will comprise a combination of lectures, practicals, and tutorials where appropriate. The remaining 42 hours will be delivered during protected learning time in the work place throughout the year. These will be required for the engagement of online learning material/online tutorials/cohort interaction.</p>
Teaching and Learning Methods	<p>Theoretical material within the module will be presented to the students in the form of 'weekly lectures' throughout each of the semesters in the academic year. During those times of work based learning, these lectures will be delivered online and involve a number of technological enhancements. The learning of syllabus content will be reinforced through time spent in independent learning by the directed reading of recommended texts and through the use of technology enhanced learning resources that will be provided online. This online learning and engagement will be delivered through several avenues:</p> <ul style="list-style-type: none"> <li>• Synchronous online tutorials in protected learning time where the student will contribute/attend an online activity appropriate to the content at the time at which the academic will be present online to facilitate and lead this scheduled/timetabled session. This tutorial will be themed/planned.</li> <li>• Asynchronous discussions in the student's own time (or during protected time where permitted and appropriate) where they will engage/collaborate with other students on the course or in specified groups, and in which the academic is permitted to moderate where necessary, but is not expected to contribute.</li> <li>• Synchronous surgery sessions timetabled for a specific time in which the academic will be available online to answer live questions via discussion boards/blogs/collaborate or to respond to questions posted/asked prior to the session.</li> <li>• Interactive, online formative quizzes made available either following a particular package of knowledge exchange/learning, or in specified sessions/time periods.</li> <li>• Lecture material delivered online through a combination of one or more of the following: visual/audio/interactivity/personal formative assessment</li> </ul> <p>A number of relevant practical sessions will be incorporated during the campus-based blocks in addition to the work-based learning that must be achieved under supervision by a workplace supervisor. Practical sessions will both drive hands-on learning and the acquisition of technical skills at both an individual and group working level.</p> <p>In addition to the lectures the students will be able to undertake fortnightly formative assessments that comprise online MCQs.</p> <p>The remainder of the independent learning time allocated to the module will be spent</p>

preparing written assessments for submission and undertaking revision for the final exam.

**Scheduled learning** includes lectures, seminars, tutorials, demonstration, practical classes and workshops; synchronous online, collaborative group work which may be timetabled on a weekly basis and participation in asynchronous online activities, case study preparation, assignment preparation and completion, exam revision etc.

**Independent learning** includes hours engaged with essential reading, assignment preparation and completion etc.

**Workbased training:** pro rata allocation of the 16 hours per week for the programme

Key Information Sets Information

Key Information Sets (KIS) are produced at programme level for all programmes that this module contributes to, which is a requirement set by HESA/HEFCE. KIS are comparable sets of standardised information about undergraduate courses allowing prospective students to compare and contrast between programmes they are interested in applying for.

Key Information Set - Module data				
Number of credits for this module				30
Hours to be allocated	Scheduled learning and teaching study hours	Independent study hours	Workbased study hours	Allocated Hours
300	60	90	150	300

The table below indicates as a percentage the total assessment of the module which constitutes a -

**Written Exam:** Unseen written exam, open book written exam, In-class test

**Coursework:** Written assignment or essay, report, dissertation, portfolio, project

**Practical Exam:** Oral Assessment and/or presentation, practical skills assessment, practical exam

Please note that this is the total of various types of assessment and will not necessarily reflect the component and module weightings in the Assessment section of this module description:

Total assessment of the module:	
Written exam assessment percentage	50%
Coursework assessment percentage	50%
Practical exam assessment percentage	0%
	100%

Reading Strategy

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. Students will be presented with opportunities within the curriculum to develop their information retrieval and evaluation skills in order to identify such resources effectively.

	<p>Any <b>essential reading</b> will be indicated clearly, along with the method for accessing it, e.g. students may be expected to purchase a set text, be given or sold a print study pack or be referred to texts that are available electronically, etc. This guidance will be available either in the module handbook, via the module information on Blackboard or through any other vehicle deemed appropriate by the module/programme leaders.</p> <p>If <b>further reading</b> is expected, this will be indicated clearly. If specific texts are listed, a clear indication will be given regarding how to access them and, if appropriate, students will be given guidance on how to identify relevant sources for themselves, e.g. through use of bibliographical databases.</p>
Indicative Reading List	<p>Susan K. Grove: <i>Statistics for Health Care Research: A Practical Workbook</i>. ISBN-13: 978-1416002260</p> <p>Martin Bland: <i>An Introduction to Medical Statistics</i>: Oxford Medical Publications 3<sup>rd</sup> Edition: ISBN 0 19 262428 8</p> <p>Martin Bland and Janet Peacock: <i>Statistical Questions in Evidence-based Medicine</i>: Oxford University Press: ISBN 0 19 262992 1.</p> <p>Harvey J. Motulsky: <i>Intuitive Biostatistics</i> (2010): Oxford University Press: ISBN13: 978-0199730063</p>

<b>Part 3: Assessment</b>	
Assessment Strategy	<ul style="list-style-type: none"> <li>The assessment strategy will include a literature review that will support the student's knowledge-base in preparation for the project, and assess their ability to communicate that knowledge-base in a concise and logical form</li> <li>The project will be assessed through a report written in a scientific format (eg as per a scientific paper); the emphasis of the project will be on the interpretation of the data gathered rather than 'proving' the original hypothesis</li> <li>Throughout the year there will be online formative tests to consolidate learning, assess progress, and prepare students for the final exam</li> <li>The examination at the end of the module will combine MCQs, short answer questions and data interpretation questions.</li> </ul>

Identify final assessment component and element		
% weighting between components A and B (Standard modules only)	<b>A:</b>	<b>B:</b>
	<b>50</b>	<b>50</b>
<b>First Sit</b>		
<b>Component A</b> (controlled conditions) <b>Description of each element</b>	<b>Element weighting</b> <b>(as % of component)</b>	
1. Examination (3h)	100	
<b>Component B</b> <b>Description of each element</b>	<b>Element weighting</b> <b>(as % of component)</b>	
1.Literature review (2000 words)	50	
2. Project write-up (2000 words)	50	

<b>Resit (further attendance at taught classes is not required)</b>	
<b>Component A</b> (controlled conditions) <b>Description of each element</b>	<b>Element weighting</b> <b>(as % of component)</b>
1.Examination (3h)	100
<b>Component B</b> <b>Description of each element</b>	<b>Element weighting</b> <b>(as % of component)</b>
1.Literature review (2000 words)	50
2. Project write-up (2000 words)	50
<p>If a student is permitted an <b>EXCEPTIONAL RETAKE</b> of the module the assessment will be that indicated by the Module Description at the time that retake commences.</p>	