University of the West of England
BRISTOL

ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data						
Module Title	Scientific Measurement					
Module Code	USSJT9-30-2		Level	2	Version	1.1
UWE Credit Rating	30	ECTS Credit Rating	15	WBL module?	No	
Owning Faculty	Health and Applied Sciences		Field	Biological, Biomedical and Analytical Sciences		
Department	Biological, Biomedical and Analytical Sciences		Module Type	Standard		
Contributes towards	FdSc Healthcare Science BSc (Hons) Healthcare Science (Life Science)					
Pre-requisites	USSJT6-30-1 Principles in Healthcare Science		Co- requisites	None		
Excluded Combinations	None		Module Entry requirements	None		
First CAP Approval Date	21st November 2012		Valid from	September 2015		
Revision CAP Approval Date			Revised with effect from			

Review Date	

Part 2: Learning and Teaching	
Learning Outcomes	On successful completion of this module students will be able to (assessment intended for each learning outcome designated by [*] corresponding to assessment section): • Understand the principles underpinning scientific research and evidence-based practice [A1, B1, B2] • Understand statistical techniques and their correct application [A1, B2] • Participate in research and development projects to explore innovations in Healthcare Science [A1, B2] • Have an awareness of how to protect the well-being and rights of the participants in evidence-based R&D [A1, B2] • Conduct a review of scientific literature on an agreed topic [B1] • Understand and/or participate in audit activities in healthcare science [A1, B2]
Syllabus Outline	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. Trainees will also put into practice effective study skills, including the use of reflective

	practice. • **The scientific method and experimental design**: Framing and testing hypotheses; planning and executing experiments; blocking and factorial experiments; collection, analysis and interpretation of data. • **Sources of measurement error/variation**: Biological variation; technical, systematic and random errors; measuring variation. • **Concepts in measurement**: Precision, accuracy and sensitivity; normal ranges; outliers; false positives/negatives. • **Relationships between variables**: Simple, multiple, linear and non-linear regression analysis; correlation. • **Comparing populations**: Paired and unpaired t-tests; Mann Whitney U and Wilcoxon tests; one- and two-way analysis of variance. • **Comparing frequencies**: Chi-squared goodness-of-fit and contingency. • **Qualitative methods**: Basis, aims and comparison to quantitative; participant observation, In-depth interviews, and focus groups. • **Audit in Healthcare Science**: Principles and practice. • **Data retrieval, analysis and presentation**: '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. • **Scientific communication**: Methods, style and structure.
Contact Hours	There will be 2 weeks of contact time at UWE in 2 x 1 week blocks. Included in each block week are laboratory workshops, lectures and tutorials. The contact time will equate to approximately 6 hours per block (a total of 12 hours). In addition to the allocated hours on campus learning, students will engage in synchronous and asynchronous online learning. This will comprise a total of approximately 60 hours of online engagement through a combination of lectures, synchronous online tutorials, synchronous and asynchronous discussions, online quizzes, and collaborative group work.
Teaching and Learning Methods	Students are expected to spend 72 hours on scheduled learning and 228 hours on independent learning. Theoretical material within the module will be presented to the students in the form of regular 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 lecture 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: • 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. • 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. • 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. • Interactive, online formative quizzes made available either following a particular package of knowledge exchange/learning, or in specified sessions/time periods. • Lectures delivered online through a combination of one or more of the following: visual/audio/interactivity/personal formative assessment

	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. The remainder of the independent learning time allocated to the module should be spent preparing written assessments for submission [B1, B2], and undertaking revision for the controlled component [A1]. **Scheduled learning** includes lectures, seminars, tutorials, project supervision, demonstration, practical classes and workshops; fieldwork; external visits; work based learning; supervised time in studio/workshop. **Independent learning** includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc. These sessions constitute an average time per level as indicated in the table below. Scheduled sessions may vary slightly depending on the module choices you make.
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: 300 — Scheduled learning and teaching study hours: 72 — Independent study hours: 228 — Placement study hours: 0 — Allocated Hours: 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. Any **essential reading** 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. If **further reading** 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. A detailed reading list will be made available through relevant channels, e.g. module handbooks, Blackboard, etc.
Indicative Reading List	Grove, S.K. (2007) *Statistics for Health Care Research: A Practical Workbook.* London: Saunders. Bland, M. (2000) *An Introduction to Medical Statistics.* 3rd ed. Oxford: Oxford Medical Publications. Bland, M. and Peacock, J. (2000) *Statistical Questions in Evidence-based Medicine.* Oxford: Oxford University Press. Motulsky, H.J. (2010) *Intuitive Biostatistics.* Oxford: Oxford University Press.

Part 3: Assessment	
Assessment Strategy	The Assessment Strategy has been designed to support and enhance the development of both subject-based and more general skills, whilst ensuring that the modules learning outcomes are attained, as described below. **Component A** Continuous assessment will be provided by the use of 6 x 30 minute online activities embedded in the module. These activities will require UWE login. The module leader will have full access to up-to-date data to monitor progress and marks obtained by students. Feedback at this level will also be provided online and will be by review of the tests after they have been completed and will include the correct answers (after the relevant assessment period has concluded). The design of these online assessed activities will be varied, for example: • Timed essay questions • MCQ • Label the structure • Prioritisation structure • Scenario based questions **Component B**

	The first element will be 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. The second element will be a project that will be assessed through a report written in a scientific format (e.g. 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. Formative feedback is available to students throughout the module through group discussions, and in workshops. Students are provided with formative feed-forward for their exam through a revision and exam preparation session prior to the exam and through the extensive support materials supplied through Blackboard. All work is marked in line with the Department's Generic Assessment Criteria and conforms to university policies for the setting, collection, marking and return of student work. Where an individual piece of work has specific assessment criteria, this is supplied to the students when the work is set. This assessment strategy has been designed following best practice on effective assessment from JISC (http://www.jisc.ac.uk/whatwedo/programmes/elearning/assessment/digiassess.aspx) and The Open University's Centre for Excellence in Teaching and Learning (http://www.open.ac.uk/opencetl/centre-open-learning-mathematics-science-computing-and-technology/activities-projects/e-assessment-learning-the-interactive-comp). Technical design and deployment of the activities will also follow best practice developed at UWE by the Education Innovation Centre in collaboration with academic colleagues across the university. Staff guidance and support are already in place (http://info.uwe.ac.uk/online/Blackboard/staff/guides/summative-assessments.asp).

Identify final assessment component and element		
% 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. 6 x 30 minute online activities embedded in the learning process	100%
Component B **Description of each element**	**Element weighting** **(as % of component)**
1. Literature review (2000 words)	50%
2. Project write-up (2000 words)	50%

Resit (further attendance at taught classes is not required)	
Component A (controlled conditions) **Description of each element**	**Element weighting** **(as % of component)**
1. Examination (3 hours)	100%
Component B	**Element weighting**

Description of each element	(as % of component)
1. Literature review (2000 words)	50%
2. Project write-up (2000 words)	50%
If a student is permitted a retake of the module under the University Regulations and Procedures, the assessment will be that indicated by the Module Description at the time that retake commences.	