



CORPORATE AND ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data					
Module Title	Blood Sciences				
Module Code	USSKBS-30-3	Level	3	Version	1
Owning Faculty	Health and Applied Science	Field	BBAS		
Contributes towards	BSc Healthcare Science				
UWE Credit Rating	30	ECTS Credit Rating	15	Module Type	Standard
Pre-requisites	Studies in the Biology of Disease (USSKAT-30-2)	Co- requisites	None		
Excluded Combinations	None	Module Entry requirements	N/A		
Valid From	September 2016	Valid to	September 2022		

CAP Approval Date	28/03/2014
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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"> • interpret biomedical data in the investigation and diagnosis of disease and discuss the origin and effects of an abnormal biochemical profile; • critically appraise the nature and diagnosis of disease in terms of abnormalities in the biochemical and molecular biological aspects of cellular process; • discuss the relevance of biochemical, molecular biological diagnostic tests in the investigation of disease; • discuss the processes involved in the maintenance of normal blood composition and function; • discuss critically the biological bases of selected haematological disease states; • interpret bold parameters that characterise selected disease states; • outline the nature and significance of investigative haematology and its role in the diagnostic process; • describe the nature and significance of human blood groups of major clinical importance and discuss barriers they represent for transfusion; • discuss the strategies which underpin optimal utilisation of donated blood; • select appropriate methods for the demonstration of different antigen-antibody reactions and investigate the chemical and physical variables which govern their sensitivity; • critically and analytically appraise relevant scientific literature; • present scientific information as a poster. (B, all other L.O. A&B)

Syllabus Outline

Philosophy of clinical biochemistry/clinical utility

An area which underpins all of current diagnostic clinical biochemistry, discussing the value of biochemical and molecular biological tests in the investigation of disease. Introducing concepts such as sensitivity, specificity, predictive values and population selection.

Enzymes

Examples of specific clinically relevant enzymes. Tissue damage and relationship to diagnostic use of enzymes and isoenzymes.

Liver function/disease

Review of fundamental liver biochemistry. Causes of acute and chronic liver disease. Liver function tests. Differential diagnosis of jaundice and other disorders.

Disorders of detoxification and excretory mechanisms - renal

Review of normal kidney functions. Tests of the glomerular function – renal clearance, GFR, serum creatinine and urea determinations. Outline of tests of tubular function. Renal calculi and their investigations.

Acid-base disorders

Review of fundamental acid-base concepts. Metabolic and respiratory causes and clinical effects of acidosis and alkalosis. Disturbances to oxygen transport. Assessment of acid-base status; diagnosis and management of acid-base disorders.

Endocrinology disorders

This will discuss the disorders of the hypothalamic pituitary target organ axis, with particular reference to the thyroid and adrenal glands. Other disorders of endocrine control will be studied which involve other systems of the body, for example: abnormalities in calcium metabolism; abnormalities in control of electrolyte and fluid balance. Furthermore, case studies will be used to discuss disorders of gonad function.

Toxicology and drug therapy

Treatment of cancer using cytotoxic drugs highlighting factors which affect treatment with chemical agents.

Plasma proteins in disease

The role of the plasma proteins in the investigation of disease. Typical topics studied include: clinical enzymology and applications in the diagnosis of coronary heart disease; paraproteins as an example of the use of proteins as tumour markers.

Molecular genetics in disease.

This topic introduces the role of molecular genetics in the investigation and understanding of disease processes such as in-born-errors of metabolism and cancer

The anaemias.

Classification systems. Megaloblastic anaemias. Iron deficiency and related anaemias. Normal erythrocyte structure and function. Red cell survival disorders. Haemoglobinopathies and the thalassaemia syndromes. Red cell enzymopathies.

Physical and chemical requirements for optimal haemopoiesis throughout life. Content of the blood and bone marrow. Reference values. Ontogeny and sites of haemopoiesis. Regulation of haemopoiesis. Nutritional requirements.

Blood donation.

Principles of the selection, collection, separation, storage and transportation of donated blood components for transfusion. The bacteriology, virology and parasitology of diseases which can be transmitted by transfusion.

	<p>Blood and tissue groups. The major blood polymorphisms e.g. ABO, Rh, and selected other blood group systems. Blood group structure, function and relevance to transfusion. Compatibility of blood and organs. In vitro antibody-antigen reactions for the selection of compatible blood. Optimisation of detection techniques for in vitro antibody-antigen reactions.</p>
<p>Contact Hours</p>	<p>The contact hours (72) are distributed as follows:</p> <p>48 hours of lectures 24 hours of tutorials/seminars</p> <p>In addition to the described contact time, this material will be supported through online learning material, including online quizzes and technology enhanced lecture material.</p> <p>Independent learning: Using defined TEL strategies includes hours engaged with essential reading, case study preparation, assignment preparation and completion etc.</p>
<p>Teaching and Learning Methods</p>	<p>Scheduled learning:</p> <p>Lectures: This module will be delivered in discrete sections, following the subject areas outlined in the syllabus. Each topic area will be introduced with underpinning lectures followed by a series of tutorials where extensive use of case studies will be made. Guided reading will be provided in advance of lectures and will direct the student to both preparative and supplementary information sources. Copies of all hand-outs will be available on Blackboard. A Web site has been constructed which links to some of the best available information sources on the internet. All links have been investigated for their validity and usefulness in this context</p> <p>Tutorials: Students will be supplied with a case study (see below) prior to the tutorial session. Tutorials will use indicative lists of questions to guide student learning. It is expected that the case study will be completed before the tutorial. Therefore, the tutorial will engage active discussion on individual and group findings. Case studies will be part of the final year assessment and therefore attendance at tutorials will be strongly encouraged.</p> <p>Poster presentation: Students will also be required to prepare a poster presentation on a piece of current research in the area of clinical biochemistry allowing the student to critically evaluate scientific literature.</p> <p>Case Studies: Case studies will be used to provide the basis of the tutorial programme. Each case study will develop a theme outlined in one of the core lectures. Each case study will be followed by a number of questions directly relevant to that case. Also, there will be an additional set of questions, which are more wide-ranging, designed to link together other aspects of clinical biochemistry and haematology with the case. Before the tutorial, students will prepare answers to the questions and be ready to discuss their answers within small groups with the lecturer. The questions given with each case study should direct the students reading and study. In addition scheduled learning also includes asynchronous online activities such as quizzes and discussion board, all available on Blackboard.</p> <p>Independent learning: In addition to lectures and tutorials students are expected to engage in independent reading where core textbooks and journals are highlighted. This extended reading will help support student for both coursework and examination preparation, where depth and detail in each area is expected. The expected time given to this aspect is 228 hours.</p> <p>Work based learning: Students will learn subject specific content during work based learning</p>
<p>Key Information</p>	<p>Key Information Sets (KIS) are produced at programme level for all programmes that</p>

Sets Information

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	Placement study hours	Allocated Hours
300	72	228		300

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

Written Exam: One unseen written exam
Coursework: One written assignment/essay and one poster presentation

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	60%
Coursework assessment percentage	40%
	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, the library catalogue and access to generic resources such as referencing tutorials. 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

The following list is offered to provide validation panels/accrediting bodies with an

Reading List

indication of the type and level of information students may be expected to consult. As such, its currency may wane during the life span of the module specification. However, as indicated above, CURRENT advice on readings will be available via other more frequently updated mechanisms.

The recommended module texts are:

Marshall, W.J., Bangert, S.K.; Clinical Chemistry 7th edition, ISBN 0723437033 -Publisher: Mosby, Release date: 2012

- Hoffbrand, A. V. & Moss, P.A.H. (2011) *Essential Haematology* (6th Ed). Wiley-Blackwell
- Overfield, J., Dawson, M.M., and Hamer, D. (2008) *Transfusion Science* (2nd Ed). Scion Publishing Limited
- Pallister, C. & Watson, M. (2011) *Haematology* (2nd Ed). Scion Publishing Limited

Other relevant sources of information from:

Clinical biochemistry Books:

All the following are held in the UWE library. The latest editions of:

Luxton, R.; Clinical Biochemistry. ISBN 0750628782 - Publisher: Arnold Publishers - Release date: 2008.

Koay, ESC and Walmsley, N.; A Primer of Chemical Pathology. ISBN 9810224494 - Publisher: World Scientific Publishing - Release date: 1996.

Devlin, T.M.; Textbook of Biochemistry with Clinical Correlations. ISBN 0471411361 - Publisher: Wiley-Liss - Release date: 2001.

Gowenlock, A.H.; Practical Clinical Biochemistry. ISBN 8123909691 - Publisher: Crc Pr I Llc - Release date: 2005.

Bishop, M.J., Fody, E.P. and Schoeff, L.; Clinical Chemistry, Principles, Procedures, Correlations 5th edition. ISBN 1451189192 - Publisher: Lippincott Williams & Wilkins, - Release date: 2013.

Gaw, A., Murphy, M.J., Cowan, R.A., Denis, S.T., O'Reilly, J., Stewart, M.J., and Shepherd, J.; Clinical Biochemistry 3rd edition, An illustrated colour text. ISBN 0-443-07269-8 - Publisher: Churchill Livingstone, 2005.

Genetics:

Jorde, L.B., Carey, J.C., Bamshad, M.J., and White, R.L. Medical Genetics 3rd edition, ISBN 0-323-02025-9 - Publisher: Mosby, 2003.

Nussbaum, R.L., McInnes, R.R., and Willard, H.F.; Thompson & Thompson Genetics in Medicine 6th edition. ISBN 0-7216-0244-4 - Publisher: Elsevier, 2004.

Turnpenny, P., and Ellard, S.; Emery's Elements of Medical Genetics 12th edition. ISBN 0-4431-0045-4 - Publisher: Elsevier, 2005.

General:

Portefield, S.P.; Endocrine Physiology 2nd edition. ISBN 0-323-01128-4 - Publisher: Mosby, 2001.

Elliott, W.H., and Elliott, D.C.; Biochemistry and Molecular Biology 3rd edition. ISBN 0-19-927199-2 - Publisher: Oxford University Press, 2005.

Haematology/Indicative sources:

All aspects of the syllabus are covered in general Haematology and Molecular Biology books such as:

- Appelbaum, F.R., Forman, S.J., Negrin, R.S. and Blume, K.G. (2009) *Thomas' Hematopoietic Cell Transplantation* (4th Ed). Wiley-Blackwell
- Daniels, G. (2013) *Human Blood Groups* (3rd Ed). Wiley-Blackwell
- Hoffbrand, V.A., Catovsky, D., Tuddenham, E.G.D. and Green, A.R. (2010) *Postgraduate Haematology* (6th Ed). Wiley-Blackwell
- Hughes-Jones, N.C., Wickramasinghe, S.N. and Hatton, C.S.R. (2008) *Haematology (Lecture Notes)* (8th Ed). Wiley-Blackwell
- Klein, H.G. and Anstee, D.J. (2014) *Mollison's Blood Transfusion in Clinical Medicine* (12th Ed). Wiley-Blackwell
- Knight, R. (2012) *Transfusion and Transplantation Science (Fundamentals of Biomedical Science)*. Oxford University Press
- McCullough, J. (2011) *Transfusion Medicine* (3rd Ed). Wiley-Blackwell
- Okpala, I. (2004) *Practical Management of Haemoglobinopathies*. Wiley-Blackwell
- Pallister, C.J. (1994) *Blood: Physiology and Pathophysiology*. Scion Publishing
- Provan, D. and Gribben, J. (2010) *Molecular Hematology* (3rd Ed). Wiley-Blackwell

Journals

- Annals of Clinical Biochemistry
- British Medical Journal
- Clinical Chemistry
- Current Advances in Clinical Chemistry
- Journal of Endocrinology
- Nature
- The Lancet
- New England Journal of Medicine
- Biochemistry Online
- Blood
- Bone Marrow Transplantation
- British Journal of Haematology
- Critical Reviews in Oncology/Haematology
- Current Opinion in Haematology
- Current Topics in Haematology
- Experimental Hematology
- Haematologica
- Journal of Thrombosis and Haemostasis
- Leukaemia
- Stem Cells
- Transfusion
- Transfusion and Apheresis Research
- Transfusion Medicine Reviews
- Transplantation Proceedings
- Vox Sanguinis

GENETests:

<http://www.genetests.org/servlet/access?id=8888892&key=9aYr9H6e6U5lo&cn=y&fw=FI3c&filename=/> this is a publicly funded medical genetics information resource developed for physicians, other healthcare providers, and researchers, available at no cost to all interested persons.

Endotext.org:

<http://www.mdtext.com/diabetes/diabetes1/diabetesframe1.htm> is the web-based source of information on endocrine disease directed to physicians around the world caring for patients with these problems. It is comprehensive, authoritative, constantly up-dated, and available without cost. This site covers the broad area of Clinical Endocrinology, emphasizing clinical endocrine practice, including the most current information on the manifestations of endocrine disease, diagnosis and treatment.

Internet sites:

International Federation of Clinical Chemistry and Laboratory Medicine:

	http://www.ifcc.org/ifcc.asp Association of Clinical Biochemists: http://www.acb.org.uk/ The Royal Collage of Pathologists: http://www.rcpath.org/ American Association of Clinical Chemists: http://www.aacc.org/
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Part 3: Assessment	
Assessment Strategy	<p>The assessment will cover the broad curriculum via an integrated poster and case study approach and a final examination.</p> <p>The coursework details two elements. The first is to prepare a poster presentation on a piece of current research in the area of blood sciences allowing the student to critically evaluate scientific literature in the context of the pathogenesis of disease and current research views. The second element will feature an integrated case study, where students will critically analyse a set clinical data based around a given case history.</p> <p>The final element is a 3 hour examination, which will assess each area using both case studies and essay type questions.</p> <p>In addition to these assessments, students will be given formative feedback in lectures and tutorials.</p>

Identify final assessment component and element		
% weighting between components A and B (Standard modules only)	A:	B:
	60%	40%

First Sit	
Component A (controlled conditions) Description of each element	Element weighting <i>(as % of component)</i>
1. EX1 Examination (3hrs)	100%
Component B Description of each element	Element weighting <i>(as % of component)</i>
1. Poster presentation	50%
2. Case study	50%

Resit (further attendance at taught classes is not required)	
Component A (controlled conditions) Description of each element	Element weighting <i>(as % of component)</i>
1. EX1 Examination (3hrs)	100%
Component B Description of each element	Element weighting <i>(as % of component)</i>
1. Extended Case study	100%
2.	

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.

