

## University of Cambridge: Programme Specifications

Every effort has been made to ensure the accuracy of the information in this programme specification. Programme specifications are produced and then reviewed annually by the relevant teaching faculty or department and revised where necessary. However, we reserve the right to withdraw, update or amend this programme specification at any time without notice.

Further information about specifications and an archive of programme specifications for all awards of the University is available online at: [www.admin.cam.ac.uk/univ/camdata/archive.html](http://www.admin.cam.ac.uk/univ/camdata/archive.html)

### MEDICAL AND VETERINARY SCIENCE TRIPOS

1	<b>Awarding body</b>	University of Cambridge
2	<b>Teaching institution</b>	University of Cambridge
3	<b>Accreditation details</b>	General Medical Council Royal College of Veterinary Surgeons
4	<b>Name of final award</b>	B.A. (Hons) (for all students) 2 <sup>nd</sup> MB/2 <sup>nd</sup> Vet MB
5	<b>Programme title</b>	Medical and Veterinary Sciences
6	<b>UCAS code</b>	A100MB/BChir D100MB/VetMB
7	<b>JACS code(s)</b>	
8	<b>Relevant QAA benchmark statement(s)</b>	Medicine; Veterinary Medicine
9	<b>Qualifications framework level</b>	6 (Honours)
10	<b>Date specification produced/ last revised</b>	October 2006
11	<b>Date specification last reviewed</b>	November 2010

### Programme Aims of Medical and Veterinary Sciences (Part I)

In the first two years, medics and vets study for both the Tripos and for the professional qualification of 2<sup>nd</sup> MB/2<sup>nd</sup> Vet MB. Some courses are assessed for both qualifications; some are for professional purposes only.

The programme aims to:

- 1) to provide high quality education in medical biosciences leading to intellectually self-reliant graduates of the calibre sought by the profession.
- 2) to provide a stimulating and challenging learning environment where teaching is informed and enhanced by research to international standards of excellence.
- 3) to provide training and experience in the scientific principles and practice of research and its evaluation.
- 4) to continue to attract outstanding students from a variety of backgrounds, and to develop their potential to enable them to contribute fully to the cultural and intellectual base of society.
- 5) to contribute to the national and international needs for practitioners and leaders in the medical profession.

### Programme Outcomes for Medical and Veterinary Sciences (Part I)

By the end of the first two years (MVST Part IA and IB) preclinical students should have:

- 1) knowledge and understanding of the basic principles and processes of human biomedical science;

- 2) been introduced to common forms of disease and the contribution made by biomedical science to understanding their basis;
- 3) begun to develop observational and deductive skills in associating molecular and cellular events with the outcomes of disease;
- 4) acquired basic laboratory manipulative skills and begun to develop skills in analysis and interpretation of experimental data;
- 5) acquired basic information technology skills in searching for and retrieving information;
- 6) begun to develop skills in oral and written communication and in learning through curiosity ;
- 7) begun to develop skills in listening to and dealing with patients;
- 8) become aware of the standards of competence, care, conduct and responsibilities expected of a member of the medical profession;
- 9) become enabled to progress to clinical training.

### **Teaching and Learning Methods**

Each subject within Part I of the course employs a variety of teaching and learning methods, including lectures, small-group teaching sessions (supervisions), computer work, practical classes, and problem based learning. In addition, medical students undertake a programme of patient contact (PfP), and vets engage in practical animal handling as part of the Principles of Animal Management course (comprising Farm Animal Husbandry and PfVP). Vets also undertake farm practice through the Extra Mural Studies programme.

At Part II, in addition to lectures, students undertake a dissertation, based on literature review or laboratory project work.

### **Support for Students and their Learning**

There is an extensive provision of student support and guidance, involving among other things

- 1) Introductory sessions at the beginning of their first year.
- 2) Individual course handbooks and websites.
- 3) University, Departmental and College libraries and computing facilities.
- 4) Students are assigned a Director of Studies and a personal Tutor by their College.
- 5) Small group tutorials (supervisions) provided by Colleges with collaboration of Departments.
- 6) Extensive staff contact in practical classes.

### **Criteria for Admission**

Because students will be simultaneously gaining academic and professional qualifications, selection for admission in **medicine** is rather more complex than for most subjects, and involves four separate hurdles:

- 1) students have to satisfy the "pre-medical requirements", which are:

Part A:

Requires General Certificate of Secondary Education (GCSE) passes at grades A, B or C in Double Award Science and Mathematics

(Note: Single awards in GCSE Biology and Physics may be substituted for Double Award Science).

Part B:

Requires General Certificate of Education (GCE) Advanced (A2) or Advanced Subsidiary (AS) Level passes in three of the following subjects: Biology; Chemistry; Mathematics;

Physics. One of the subjects must be Chemistry and at least one pass must be at GCE A2 Level.

- 2) students must also meet the criteria that have been formulated by the Council of the Heads of Medical Schools as being necessary in order to start as a medical student
- 3) the Cambridge course is scientifically demanding and nearly all successful candidates gain at least three A grades at A-level. From 2010 the standard entry requirement for Cambridge has been set at A\*AA
- 4) students must also undergo a check for any criminal record through the Criminal Records Bureau (or similar if from overseas).

For admission in **veterinary medicine**, the requirements are broadly similar:

- 1) students have to satisfy the "pre-medical requirements", which are:  
Part A:  
Requires General Certificate of Secondary Education (GCSE) passes at grades A, B or C in Double Award Science and Mathematics  
(Note: Single awards in GCSE Biology and Physics may be substituted for Double Award Science).  
  
Part B:  
Requires General Certificate of Education (GCE) Advanced (A2) or Advanced Subsidiary (AS) Level passes in three of the following subjects: Biology; Chemistry; Mathematics; Physics. One of the subjects must be Chemistry and at least one pass must be at GCE A2 Level.
- 2) the Cambridge course is scientifically demanding and nearly all successful candidates gain at least three A grades at A-level. From 2010 the standard entry requirement for Cambridge has been set at A\*AA
- 3) students must also undergo a check for any criminal record through the Criminal Records Bureau (or similar if from overseas).

### **Mechanisms for evaluating and improving the quality of student learning support**

Students have termly meetings with their College Tutor and Director of Studies to monitor and review their progress. This is facilitated by reports submitted to the Colleges by the student's supervisors on each course.

The College tutorial and pastoral system is backed up by the Medical and Veterinary Student Progress Panel, which maintains a general overview of medical and veterinary student progression throughout both the preclinical and clinical course at Cambridge. It also monitors the cases of students who for one reason or another may be having problems with the course. This may be because of illness, personal difficulties or due to repeated examination failures.

Each course in the MVST has a course management (or teaching) committee, which regularly reviews the content of that course, student feedback and comments from examiners. Students are represented on these committees.

All courses have External Examiners, who are required to submit a report on the examination to the University. This is normally responded to by the DOMVE with appropriate input from

the Head of Department, or an appointed deputy. The report and response is scrutinised by the General Board's Education Committee.

The first two years of the course are managed by the MVST I Committee. This Committee reports to the Faculty Boards of Biology and Clinical Medicine or Veterinary Medicine and to the Medical Education Committee or Veterinary Education Committee which take an overview of the whole course, pre-clinical and clinical, and advise on changes necessary to meet changing demands of the professional bodies. Students are represented on these committees and encouraged to survey their colleagues and raise matters for consideration.

All Departments teaching in the Tripos are reviewed by the General Board once every six years.

## Assessment

The examination for each subject of MVST 1A and 1B is divided into three sections. Sections I and II are assessed for both the Tripos and the 2<sup>nd</sup> MB/2<sup>nd</sup> Vet MB. Section III is assessed for the Tripos only.

- Section I is a theory paper, and is assessed either by MCQ or short notes.
- Section II is a practical or data handling paper, and is usually assessed by MCQ or short notes.
- Section III is an essay paper.

## The Third Year

An enormous range of courses is available in year three. Students may take in-depth courses in many of the subjects studied in their first two years; these are offered in the NST Part II courses. Students who wish to maintain breadth of study can combine courses from different departments in NST Part II BBS. Alternatively, they may choose to take courses in something rather different, such as Anthropology, Management Studies or Philosophy.

## Outline of the Part I Medical and Veterinary Sciences Tripos

Individual courses focus on the “core” scientific knowledge, which doctors or vets need to have in order to cope with clinical practice.

Students who do not have A level Biology may take a short preparatory course in **Cell Biology**.

## First Year Courses

### Second MB and Tripos

- 1) the overall layout of the structures of the body is covered in **Functional Architecture of the Body** (Medics) and **Veterinary Anatomy and Physiology** (Vets)
- 2) the chemical and molecular mechanisms underlying the functions of the body and the mechanisms that govern inheritance in **Molecules in Medical Science** (Medics and Vets)
- 3) the mechanisms that underlie communication within the body, and the maintenance of the stability of the internal environment in **Homeostasis and Histology** (Medics and Vets)

### Second MB (Medics)

- 1) The **Preparing for Clinical Practice** course comprises two components:
  - i) patients and societal context are introduced in **The Social Context of Health and Illness**
  - ii) students begin encountering patients in the community in **Preparing for Patients A (PfPA)**. Subsequent parts of this course take place in the second year (PfPB and PfPC) and in the third year (PfP D), and satisfactory completion of all four parts is required for Second MB qualification.
- 2) basic concepts of epidemiology and biostatistics as tools for critical assessment of the quality of scientific evidence and appropriate inference are introduced in the **Introduction to the Scientific Basis of Medicine**

### **Second Vet MB (Vets)**

- 1) The **Principles of Animal Management** course comprises two components:
  - i) basic animal husbandry and nutrition is introduced in **Farm Animal Husbandry**
  - ii) the nature of the veterinary vocation as well as some practical training in animal handling and restraint is covered in **Preparing for the Veterinary Profession**
- 2) basic concepts of epidemiology and biostatistics as tools for critical assessment of the quality of scientific evidence and appropriate inference are introduced in **the Introduction to the Scientific Basis of Medicine**

## **Second Year Courses**

### **Second MB and Tripos**

- 1) the mechanisms by which drugs act upon the body are covered in **Mechanisms of Drug Action** (Medics and Vets)
- 2) the biological processes underlying disease are dealt in **Biology of Disease** (Medics and Vets)
- 3) the structure and function of the reproductive system is covered in **Human Reproduction** (Medics)
- 4) the structure and function of the sense organs and the central nervous system, and the study of mental processes are covered in **Neurobiology and Human Behaviour** (Medics)
- 5) the structure and function of animal reproductive systems in **Veterinary Reproductive Biology** (Vets)
- 6) the structure and function of the sense organs and the central nervous system and basis of animal behaviour are covered in **Neurobiology and Animal Behaviour** (Vets)
- 7) further study of veterinary anatomy is undertaken in **Comparative Vertebrate Biology** (Vets)
- 8) Medical Students have the opportunity to study some subjects in more detail in two **Options** courses, chosen from a range of subjects

### **Second MB and Second Vet MB**

- 1) Medics continue to develop their experience in **Preparing for Patients B and C (PfPB and C)**.
- 2) Vets undergo further development of experience in **Preparing for the Veterinary Profession (PfVP)**.

The tables below summarise these courses and their assessment, and details of the aims and content of individual courses are provided in the following sections

### MVST Part IA (First Year) Medical and Veterinary Courses

	Medical Students	Veterinary Students	Assessment		
<b>Enabling courses</b>	Cell Biology		not separately assessed		
	Histology				
<b>Common courses</b>	Homeostasis (HOM)		2nd M.B.	2nd Vet M.B.	Tripes
	Molecules in Medical Science (MIMS)		2nd M.B.	2nd Vet M.B.	Tripes
	Introduction to the Scientific Basis of Medicine (ISBM)		2nd M.B.	2nd Vet M.B.	
<b>Parallel courses</b>	Functional Architecture of the Body (FAB)		2nd M.B.		Tripes
		Veterinary Anatomy and Physiology (VAP)		2nd Vet M.B.	Tripes
<b>Clinical strand</b>	The Social Context of Health and Illness (SCHI)		2nd M.B.		
		Farm Animal Husbandry (FAH)		2nd Vet M.B.	
	Preparing for Patients A (PfPA)		2nd M.B.		
		Preparing for the Veterinary Profession (PfVP)		2nd Vet M.B. – assessed at Part IB	

### MVST Part IB (Second Year) Medical and Veterinary Courses

	Medical Students	Veterinary Students	Assessment		
<b>Common courses</b>	Biology of Disease (BOD)		2nd M.B.	2nd Vet M.B.	Tripes
	Mechanisms of Drug Action (MODA)		2nd M.B.	2nd Vet M.B.	Tripes
<b>Parallel courses</b>	Neurobiology and Human Behaviour (NHB)		2nd M.B.		Tripes
		Neurobiology and Animal Behaviour (NAB)		2nd Vet M.B.	Tripes
	Human Reproduction (HR)		2nd M.B.		Tripes
		Veterinary Reproductive Biology (VRB)		2nd Vet M.B.	Tripes
		Comparative Vertebrate Biology (CVB)		2nd Vet M.B.	Tripes
	Optional Course, List I				Tripes
	Optional Course, List II				Tripes
<b>Clinical strand</b>	Preparing for Patients B (PfPB)		2nd M.B.		

		Preparing for the Veterinary Profession (PfVP)		2nd Vet M.B.	
--	--	--	--	-----------------	--

### **Part IA Molecules in Medical Science (MIMS)**

(Tripos, 2<sup>nd</sup> MB/2<sup>nd</sup> Vet MB)

This course is run by the Department of Biochemistry with contributions from the Clinical School, Genetics, MRC Human Nutrition Research, Pathology, Pharmacology and Veterinary Medicine.

#### **Aims**

The course aims to provide students with a basic understanding of:

- 1) the molecular architecture of eukaryotic cells and organelles, including membrane structure and dynamics;
- 2) the principles of bioenergetics and enzyme catalysis;
- 3) the chemical nature of biological macromolecules, their three-dimensional construction, and the principles of molecular recognition;
- 4) dietary requirements of man and selected domestic animals;
- 5) the metabolism of dietary and endogenous carbohydrate, lipid and protein;
- 6) the principles and major mechanisms of metabolic control and of molecular signalling by hormones;
- 7) the control of cell proliferation;
- 8) how the DNA in a genome is organized, replicated and repaired;
- 9) how genetic information in the DNA is selectively expressed as functional proteins;
- 10) how genes are transmitted between generations, and how and when errors can arise;
- 11) how natural polymorphism and genetic variation can give rise to mutant genes, and how these genetic errors are inherited;
- 12) how inherited genetic errors can cause both single gene and multifactorial diseases and the consequences of this inheritance for individuals and populations;
- 13) the tools used in molecular genetics, and their potential applications to medical and veterinary science;
- 14) from their own laboratory practice, the experimental dimension of the molecular approach to biology;
- 15) the significance for clinical and veterinary practice of the molecular approach to medical science;
- 16) an awareness of the ethical aspects of molecular science.

#### **Learning outcomes**

By the end of the course, students should be able to:

- 1) demonstrate knowledge and understanding of the molecular machinery of living cells;
- 2) demonstrate knowledge and understanding of the principles that govern the structures of macromolecules and their participation in molecular recognition;
- 3) demonstrate knowledge and understanding of the principles and basic mechanisms of metabolic control and molecular signalling;
- 4) use basic laboratory skills and apparatus to obtain reproducible data from biochemical experiments;
- 5) implement experimental protocols, and adapt them to plan and carry out simple investigations;
- 6) analyse, interpret, and report to their peers on the results of their laboratory experiments;
- 7) participate in and report orally on team work investigations of problem-based assignments;



- 8) build on their knowledge and understanding in tackling more advanced and specialised courses, and to more widely pursue independent, self-directed and critical learning.

### **Teaching and Learning Methods**

These include lectures, supervisions, practicals and linked discussions which include data interpretation and handling, problem-based learning, and a computer-based bioinformatics exercise.

## **Assessment**

Assessment for this course is through MCQs, data handling exercises and an essay paper.

### **Part IA Homeostasis (HOM)** (Tripos, 2<sup>nd</sup> MB/2<sup>nd</sup> Vet MB)

This course is run by the Department of Physiology, Development and Neuroscience.

## **Aims**

The course aims to:

- 1) provide students with an understanding of the fundamental scientific concepts, the core knowledge and clinical relevance of the homeostatic mechanisms and physiological functioning of the body, excluding the reproductive system, the sense organs and the central nervous system;
- 2) to develop students' investigative skills and familiarity with standard laboratory and clinical techniques of observation and measurement, and gain practice and confidence in applying these skills, in a quantitative manner where appropriate.

## **Learning outcomes**

By the end of the course of lectures students should understand the principles and have a core of knowledge of the individual topics set out in the course synopsis. They should also:

- 1) acquire a sense of the broad nature of homeostasis, of the integrated way in which the systems of the body interact in response to changes in conditions, and the types of inter- and intra-cellular communication that make this possible;
- 2) gain a preliminary sense of the consequences of malfunction of these systems;
- 3) meet the objectives for each set of lectures, which are set out in the individual lecture handouts.

## **Practicals**

By the end of the course students should have:

- 1) learnt to observe and make intelligent deductions, relating the way in which real tissues behave to the necessarily abstracted descriptions in their lectures;
- 2) learnt to design procedures and experiments that efficiently address both pre-defined questions and also open-ended ones;
- 3) learnt the techniques of collection, analysis and presentation of numerical and graphical data, including methods for recognising and dealing with systematic and random errors of measurement;
- 4) gained experience in using modern experimental techniques and familiarity with common items of equipment, including the use of computers for data-acquisition, presentation and analysis, and also in simulations of biological systems;
- 5) learnt how to carry out skilled tasks in co-operation with others, and how to carry out procedures on human subjects with consideration and due regard to health and safety procedures and to ethical considerations;
- 6) by being subjects for experiments. Learnt at first hand how physiological perturbations are reflected in subjective sensations, and something of what it is to be a patient rather than a doctor;

- 7) gained manual dexterity in standard manipulative procedures, and particularly in the handling of biological tissue;
- 8) learnt to appreciate the intrinsic difficulties of experimental work on animal tissue and human subjects, and also to experience some of the pleasures that such investigation can bring.

### **Teaching and Learning Methods**

These include lectures, supervisions, and practicals.

### **Assessment**

Assessment for this course is through MCQs and short notes questions, data handling and analysis exercises and an essay paper. Students are also required to submit practical notebooks.

#### **Part IA Histology** (Tripos, 2<sup>nd</sup> MB/2<sup>nd</sup> Vet MB)

This is a practical course run by the Department of Physiology, Development and Neuroscience.

### **Aims**

The course aims to:

- 1) To provide students with an understanding of the microscopic structure of cells and tissues with emphasis in the correlation between structure and function.
- 2) To provide a practical experience in the examination of the microscopic anatomy and ultrastructure of cells and tissues to support other Part IA courses, particularly Homeostasis, Functional Architecture of the Body, Veterinary Anatomy and Physiology, and Cell Biology.
- 3) To provide the basis of understanding of normal tissue structure needed to prepare for certain Part IB courses, such as Biology of Disease, Human Reproduction, and Veterinary Reproductive Biology.

### **Learning outcomes**

By the end of the course, students should be able to:

- 1) Use a binocular microscope.
- 2) Using light microscopy, recognise the principal categories of cells and tissues, in sections through a tissue.
- 3) Form a conception of the structure of a tissue in three dimensions, from a two-dimensional image.
- 4) Interpret electron micrographs, including the identification of different types of cell organelles.
- 5) Suggest, on the basis of 2, 3 and 4, the functions of the tissue examined, and correlate structural and functional features.
- 6) Recognise and describe the structural features of the cells and tissues involved in the following physiological functions: nervous and neuromuscular conduction, autonomic control, muscular contraction, cardiovascular, respiratory, renal and body-fluid balance, gastrointestinal, hepatic, pancreatic, temperature regulation and endocrine.

- 7) Understand the structural features that underlie the following properties of cells: division, movement, apposition, differentiation, death, polarity, secretion, and lineage.
- 8) Understand how and why the structure of a tissue may alter with both age and functional state.
- 9) Begin the process of recognising the structural consequences of disease.

## **Teaching and Learning Methods**

These include practical classes with the guidance and support from Demonstrators; small-group discussions; student team-work in groups of three or four around a computer work station; use of Histology computer modules (these modules are also available online in the cam domain for the students to study and revise at their convenience); use of video cameras, which enable to display any image from the slides on the computer screen.

## **Assessment**

Assessment for this course is through MCQs and short notes questions. Histology is assessed as a component of Section II of the MVST Part IA Homeostasis examination. In recent years, Histology has contributed 10% to the Tripos mark for Homeostasis and 20% to the Second MB/Vet MB.

## **Part IA Functional Anatomy of the Body (FAB) (Medics only)** (Tripos and 2<sup>nd</sup> MB)

This course is run by the Department of Physiology, Development and Neuroscience.

## **Aims**

The course aims to provide students with:

- 1) an understanding of the structure and organisation of the human body, including the identification of its components and tissues and their principal relationships in dissected cadavers, living subjects and imaged material,
- 2) an understanding of the relationship of structure to function,
- 3) an awareness of the range of normal variation among individuals and within an individual through life,
- 4) an awareness of how the body plan is established,
- 5) an awareness of the scientific and practical bases of anatomical knowledge including the principles of observation, correlation and experimentation and the skills used in gaining this knowledge,
- 6) an awareness of how anatomical knowledge may be applied effectively in clinical and scientific contexts,
- 7) an awareness of how ethical and attitudinal issues impinge on the study of anatomy, on the application of anatomical knowledge, and on communication about it,
- 8) the beginnings of an understanding of how to pursue independent, self-directed, reflective and critical learning,
- 9) the beginnings of an understanding of how to work effectively and co-operatively in small groups.

## **Learning Outcomes**

By the end of the course, students should be able to:

- 1) demonstrate a knowledge and understanding of the body particularly the anatomy underlying common clinical problems and procedures,
- 2) recognise common variations and understand the causes,
- 3) observe surface markings, feel and identify anatomical features, listen to cardiovascular, respiratory and alimentary sounds, and do all sensitively and with respect for the subject.
- 4) interpret common diagnostic images.
- 5) know the anatomical bases for clinical examination and clinical procedures,

- 6) communicate effectively, sensitively and ethically about the body using the appropriate language to colleagues and lay persons.
- 7) communicate relevant information in concise, unambiguous writing, with sketched illustrations.

### **Teaching and Learning Methods**

These include lectures, supervisions, and dissection and prosection classes.

### **Assessment**

Assessment for this course is through MCQs, a steeplechase practical and essays.

## **Part IA Social Context of Health and Illness (SCHI) – medics only** (2<sup>nd</sup> MB only)

This course is run by the Clinical School.

### **Aim**

This course serves as an introduction to the relevance and value of a social science perspective for medical practice. It draws on a range of disciplines to explore how ideas of health, illness and treatment are differently understood, and the impact this can have on health care provision. In addition, it explores the influence of demographic and cultural variables, and consequently aims to demonstrate some of the links between medicine and its social context.

The course aims to address objectives outlined in [\*Tomorrow's Doctors\*](#).

### **Learning outcomes**

By the end of the course, students should be able to:

- Demonstrate a basic knowledge of relevant material, including key texts and authors
- Critically engage with a range of social science perspectives
- Apply theoretical ideas and concepts to practical examples, including relevant contemporary issues
- Establish links with concurrent and future components of their studies

### **Teaching and Learning Methods**

These include lectures, seminar-style supervisions, and on-line self learning support materials.

### **Assessment**

Assessment for this course is by unseen examination requiring candidates to write two essays.

**Part IA Introduction to the Scientific Basis of Medicine (ISBM)**  
(Tripos, 2<sup>nd</sup> MB/2<sup>nd</sup> Vet MB)

This course is run by the Institute of Public Health. It is in two strands, Epidemiology and Medical Statistics.

**Epidemiology**

**Aim**

To provide an introduction to epidemiology and its application in medicine

**Objectives**

- 1) to provide an understanding of basic concepts in epidemiology and their relevance to clinical practice and disease prevention in patients and in the community;
- 2) to introduce tools for critical assessment and evaluation of the quality of the scientific literature and appropriate application of findings to medical practice.

**Learning outcomes**

- 1) understanding of different measures of rates and risks and their application in practice;
- 2) understanding of principles of screening, and measures of validity of test including sensitivity, specificity and predictive value and their relevance to practice;
- 3) understanding how to make comparisons: basic epidemiologic study designs (cross sectional, case control, longitudinal and intervention studies), their strengths and limitations;
- 4) ability to interpret data appropriately and to make sensible inferences from such data; understanding and definitions of bias and confounding, and concepts of causality and generalisability;
- 5) ability to evaluate scientific literature critically and sensibly.

**Medical Statistics**

**Aim**

To introduce the relevance, concepts and basic applications of statistics in medical science.

**Objectives**

- 1) to introduce medical statistics as a subject, and descriptive statistics within it for summarizing data numerically and graphically;
- 2) to show how to estimate numerical features of populations from samples of data, using and correctly interpreting confidence intervals to quantify uncertainty;
- 3) to introduce another branch of statistical inference, hypothesis testing as the technique to help decide if sample results are a matter of chance or indicative of a genuine effect;

- 4) to extend hypothesis tests to two samples of data, allowing comparisons of groups (e.g. those exposed to a risk factor or not);
- 5) to discuss research as published in the biomedical literature, and how to discern if a paper's results provide valid and applicable evidence.

### **Learning Outcomes**

- 1) appreciate the role of statistics in medicine;
- 2) develop a 'statistical eye' when viewing data or reading the literature;
- 3) understand statistical and epidemiological principles of design/analysis;
- 4) know when and how to apply basic statistical methods;
- 5) realize the need to consult a statistician at appropriate times.

### **Teaching and Learning Methods**

Lectures and supervisions

### **Assessment**

Assessment for this course is by an MCQ paper

### **Part IA Veterinary Anatomy and Physiology (Vets Only)** (Tripos and 2<sup>nd</sup> Vet MB)

This course is run by the Department Physiology, Development and Neuroscience.

### **Aims**

The course is designed for students studying to be vets who may end up in any of a huge range of different jobs, from practice (small, large, equine, mixed) to Government Departments (meat hygiene, public health) industry (pharmaceutical etc), in zoos or labs, in welfare, in research, in teaching and so on. Hence the course aims to give an appreciation of the role of anatomy in:

- 1) diagnosing, treating and controlling disease in vertebrate animals;
- 2) the reproduction and husbandry of animals and their products;
- 3) its central contribution to biological science;
- 4) helping people enjoy, marvel or delight in the animals around us.

The focus is on the core anatomy of domestic mammals. Wild animals receive passing attention.

### **Objectives**

By the end of the course students should:

- 1) understand the language of anatomy, sufficient to communicate fluently with clients and colleagues, and to comprehend texts and original articles. This means that students should not only be comfortable with formal jargon but also with colloquial terms too – practising vets spend more time talking to lay people than to other vets or scientists.
- 2) be familiar with anatomical principles.
- 3) know how to find anatomical information from personal observations, and the observations of others.
- 4) know essential anatomical detail relevant to commonplace veterinary activities.



- 5) have developed skills for learning anatomy, knowing how much to learn, recalling it and utilising it in the interpretation of living animals in various postures and physiological states.

### **Teaching and Learning Methods**

These include lectures, supervisions and dissection and prosection classes.

### **Assessment**

Assessment for this course is through MCQs, short answer questions, a practical and an essay paper.

### **Preparing for Patients (Medics Only)** (2<sup>nd</sup> MB)

This course is run by the Clinical School over the three years of the pre-clinical course. It is divided into four strands. The course aims to give students the opportunity to relate the core science courses to real patients' experiences of health problems, and to prepare them for clinical study by starting to develop the communication skills they will need to interact successfully with patients.

#### **First Year Strand : General Practice (PfPA) - Students visit a GP's Surgery**

##### **Aims**

- 1) to support students to interact respectfully and ethically with patients;
- 2) to allow students to take their first step to conduct a medical interview
- 3) to show the linkage between core science learning and clinical practice including patients' health problems and experiences.

##### **Objectives**

By the end of the PfPA programme, students should be able to:

- 1) conduct a simple medical interview, discussing with patients their health problems, their experience of them and their expectations of health care;
- 2) demonstrate understanding of the principles of consent and confidentiality and the practicalities of respecting consent and preserving confidentiality;
- 3) identify what influenced the success of their interviews from the perspective of the patient and themselves
- 4) look across their experiences with different patients in General Practice to identify a challenge during an interview and potential solutions.

#### **Second Year Strand : Hospital Medicine (PfPB)**

Students visit a hospital

##### **Aims**

- 1) to enable students to further explore patients' experience and understanding of illness;
- 2) to continue and extend students' introduction to the medical interview;
- 3) to link students' core science learning to patients' experiences of illness.

## **Objectives**

By the end of the PfPB programme, students should be able to:

- 1) conduct a more complex medical interview than in PfPA, discussing with patients the reasons for their admission to hospital, the symptoms that they have suffered, their experience of their health problems and their expectations of health care;
- 2) understand the feelings and experiences of being a patient in hospital and identify good practice that helps to improve patients' experiences;
- 3) identify what influenced the success of your interviews from the point of view of the patient and, from your own perspective, in gathering information about disease and illness;
- 4) explain a characteristic of a patient's illness in terms of your knowledge of core science relevant to medicine.

### **Second/Third Year Strand: Non-clinical Community Experience (PfPC)**

Students visit a statutory, voluntary or other health related agency

## **Aims**

To provide students with the opportunity to experience health care in a wider context within society by exploring, from a user's perspective, agencies, groups, organisations and networks that are involved in supporting people with health problems in the community.

## **Objectives**

By the end of the programme students will be able to:

- 1) describe the services provided to support people with health problems by the agency, group, organisation or network visited in the community;
- 2) assess the strengths and weaknesses of such services and how they interface with the work of primary and secondary health care teams;
- 3) define the evidence that would help a medical practitioner evaluate the value of the service to users
- 4) understand the ease or difficulty that clients have in accessing these services.
- 5) reflect on how visiting these agencies, groups, organisations or networks has affected their understanding of the provision of health care in society

### **Third Year Strand : Continuity of Care (PfPD)**

Students follow a pregnancy over time, visiting women in their own homes.

## **Aims**

- 1) To continue and extend students introduction in conducting the medical interview
- 2) To enable students' to appreciate the importance of developing an ongoing patient-doctor relationship
- 3) To enable students' to make the linkage between the human reproduction course and patients experiences

## **Objectives**

By the end of the programme students will:

- 1) have built a relationship with a patient over a period of time, developing a deeper understanding than can be achieved in just one meeting

- 2) conducted a series of extended medical interviews, discussing with one woman her pregnancy, her experience of it and her expectations of maternity care;
- 3) explored the different roles of professionals involved with pregnancy;
- 4) considered how the family as a whole is affected by a pregnancy;
- 5) made links between core science learning and women's experiences of pregnancy.

### **Teaching**

Briefing and review sessions

### **Assessment**

Assessed structured reports

**Principles of Animal Management (Comprising Farm Animal Husbandry (FAH) and  
Preparing for the Veterinary Profession First Year Strand (PfVPA)  
(Vets Only)**  
(2nd Vet MB)

This course is run from the Veterinary School in the first year.

### **Aims**

The course programme is designed to provide a fundamental level of knowledge and understanding of the important features of animal management, namely nutrition, reproduction, genetics and breeding, housing and environmental control, behaviour and welfare. The course will integrate this knowledge and understanding with an appreciation of the structure and economic basis of the major UK animal industries. Principles of animal requirements will be considered across species and details of the practical application of these principles within each of the important animal industries will be considered on a species basis. This approach aims to develop a deep understanding of the principles of animal management needed to underpin future training in the clinical aspects of veterinary science.

### **Learning objectives**

By the end of the course, students should:

- appreciate of the role of important animal industries in the UK;
- understand the structure of the important UK animal industries for both farm and companion animal species and the economic importance of these industries;
- appreciate the differences in approach to the management of farm animals compared with companion animals;
- appreciate the basis of an animal's responses to changes in the climatic environment and how these influence housing needs, productivity and welfare outcomes;
- understand how the nutritional requirements of animals are determined and how feeding systems are formulated and their adequacy assessed;
- appreciate how animals are fed and housed in practice and how this together with an understanding of the elements of animal behaviour form a basis for a scientifically based appraisal of animal welfare;
- understand the role of veterinarians in providing advice on the management of farm and companion animals.

### **Teaching**

By lectures, practicals and CAL packages.

### **Assessment**

MCQs.



## **Second Year Stand (PfVPB)**

### **Aims**

To enable students to understand the role of the veterinary profession in society in its widest sense and provide a context for core science teaching.

### **Objectives**

By the end of the course students should

- 1) understand the ethical, professional and social responsibilities of the profession;
- 2) understand the context in which their veterinary education is given;
- 3) understand the ethical issues relating to the use of animals in research, farming sport and in other areas;
- 4) understand the issues relating to the treatment of terminal disease in animals;
- 5) understand the roles of the VDS and RCVS in litigation, discipline and ethical conduct and in the protection of veterinary surgeons and the public;
- 6) understand the role of the veterinary profession in the safeguarding of public health, in its relation to other healthcare professions and its role in public debate on a variety of issues including human health;
- 7) understand the organisation and role of the State Veterinary Service;
- 8) understand the process involved in the production of food from farm animals and veterinary involvement in this process.

### **Teaching**

By lectures, seminars and discussion sessions and supervisions, as well as practical animal handling sessions in the first year.

### **Assessment**

MCQ examination. Animal handling is also assessed during rotations.

## **MVST 1B – Biology of Disease (BOD)** (Tripos and 2<sup>nd</sup> MB/2<sup>nd</sup> Vet MB)

This course is run by the Department of Pathology.

### **Aims**

- 1) to describe the mechanisms underlying disease processes in terms of molecular and cellular biology and deviation from normal physiology;
- 2) to convey an understanding of the natural history and dynamic nature of disease.

### **Learning Objectives**

By the end of this course of lectures and practicals students should be able to:

- 1) demonstrate knowledge and understanding of the cellular response to injury;
- 2) demonstrate knowledge and understanding of the processes of innate and adaptive immunity, including inflammation;
- 3) demonstrate knowledge and understanding of the basic structure of viruses, bacteria, parasites; how these pathogens evade host defences and cause disease; and the principles underlying the transmission, epidemiology and control of infectious disease;

- 4) demonstrate knowledge and understanding of the processes responsible for the deregulation of cellular growth and differentiation, and the manifestations and effects of this in the genesis and growth of tumours;
- 5) demonstrate knowledge and understanding of the processes whereby the normal blood circulation may be disrupted through pathology in blood vessel walls, disorders of haemostasis, or otherwise altered cardio-vascular physiology, and the ensuing processes of thrombosis, embolism, ischaemia and infarction;
- 6) identify and concisely describe these basic processes as manifested by altered cell tissue and organ structure;
- 7) demonstrate an understanding of the principles and practice of the sterile techniques, antisepsis, the handling of pathogenic viruses and bacterial pathogens;
- 8) demonstrate skills in the basic techniques for growth and identification of common bacterial species and the quantitative analysis of viral infection and growth;
- 9) demonstrate familiarity with basic methods for investigating the major immunological processes; and
- 10) solve simple problems that require interpretation of the manifestations of disease at the levels of clinical manifestation and molecular, cellular and tissue dysfunction.

### **Teaching and Learning methods**

Lectures, practicals and supervisions

### **Assessment**

MCQs, essays and practical/data handling paper

### **MVST 1B – Human Reproduction (Medics Only)** (Tripos and 2<sup>nd</sup> MB)

This course is run by the Department Physiology, Development and Neuroscience.

### **Aims**

To provide a basic understanding of:

- 1) the biology of human reproduction;
- 2) the social and ethical context within which reproductive events take place;
- 3) how to begin applying this understanding to clinical problems.

### **Learning Objectives**

By the end of this course of lectures and practicals students should understand

- 1) how the two sexes are generated, mature and function;
- 2) the relationship between sex, gender and sexuality;
- 3) how the menstrual cycle is regulated and the potential influence of external factors such as stress, relationships and the environment;
- 4) how mature male and female gametes are formed, come together and generate a conceptus;
- 5) how the conceptus develops, signal its presence to the mother and establishes a pregnancy;
- 6) how pregnancy is maintained successfully through to parturition;
- 7) how labour and delivery are initiated and controlled, and a new born mammal is nurtured;
- 8) the main types of reproductive loss and morbidity and their causes;
- 9) the social and ethical issues raised by the advent of assisted reproduction technologies;
- 10) the social and ethical issues raised by the advent of assisted reproduction technologies;

- 11) the principles of medical ethics, informed consent, confidentiality and the clinical relationship;
- 12) ethical issues around reproduction, death and caring for populations;
- 13) the principles of demography, and their application to reproduction;
- 14) how birth and death rates and population size have changed with economic and social development.

### **Teaching**

Lectures, supervisions and practical classes

### **Assessment**

MCQs and essays

## **MVST IB - Veterinary Reproductive Biology (VRB) (Vets Only)** **(2<sup>nd</sup> Vet MB/Tripes)**

This course is run by the Department of Physiology, Development and Neuroscience

### **Aims**

To provide students with a basic understanding of

- 1) the biology of mammalian reproduction and lactation.
- 2) the transition from intra - to extrauterine life.
- 3) how to apply this knowledge to clinical situations.

### **Learning Objectives**

By the end of the course of lectures and practicals, students should understand:

- 1) The properties, and biological actions of the reproductive hormones.
- 2) How the two sexes are generated and mature.
- 3) How the ovarian cycles are regulated in different species.
- 4) The potential influence of external factors such as light, nutrition, touch on male and female fertility.
- 5) How mature male and female gametes are formed, come together and generate a conception.
- 6) How the conception develops, signals its presence to the mother and establishes a pregnancy.
- 7) How the placenta is formed and functions.
- 8) How pregnancy is maintained successfully through to parturition.
- 9) How the fetus grows and develops in utero.
- 10) What adaptations the mother makes to accommodate the growing fetus.
- 11) How labour and delivery are initiated and controlled.
- 12) The processes of neonatal adaptation to extrauterine life.
- 13) How the newborn animal is nurtured.
- 14) The main types of reproductive losses and neonatal viability and their causes.
- 15) The methods by which reproduction can be manipulated in animals.

### **Teaching**

Lectures, supervisions and practicals



## **Assessment**

MCQs and essay paper

**MVST 1B Neurobiology and Human Behaviour (NHB) (Medics Only)**  
**MVST 1B Neurobiology and Animal Behaviour (NAB) (Vets Only)**  
(Tripos, 2<sup>nd</sup> MB/2<sup>nd</sup> Vet MB)

These courses are run by the Department Physiology, Development and Neuroscience

**Aims**

- 1) to provide a broad-based course on the structure and function of the central nervous system;
- 2) to provide students with a clear understanding of the basic principles of neurobiology;
- 3) to enable students to understand the basis for common neurological and behavioural problems.

**Objectives**

- 1) to introduce the scientific concepts underlying the study of the central nervous system;
- 2) to provide students with an understanding of the principles underlying sensory, motor, motivational and cognitive processes, and how these contribute to behaviour;
- 3) to understand the functional and behavioural consequences of disorders
- 4) of the nervous system, and how they might be influenced by drugs;
- 5) to provide core knowledge relevant to a career in medicine/veterinary medicine.

**Teaching**

Lectures, supervisions and practicals

**Assessment**

Short notes and essay paper

**MVST 1B – Mechanisms of Drug Action (MODA)**  
(Tripos, 2<sup>nd</sup> MB/2<sup>nd</sup> Vet MB)

This course is run by the Department of Pharmacology

**Aims**

- 1) to give students a core knowledge in basic pharmacology and so lay a secure foundation in principles of drug action to support future courses in medicine and veterinary medicine which students will carry with them into their professional careers;
- 2) to allow students to develop their experimental and data analysis skills through a range of experiments carried out in the practical laboratories and attendance at demonstrations and supervisions.

**Learning Outcomes**

At the end of the course each student is expected to be able to

- 1) demonstrate a broad knowledge of modern pharmacology, from the molecular basis of receptors, to the effect of drugs on whole body systems;
- 2) identify the major classes of drug receptors and sites of drug action within the body;
- 3) identify typical examples of drugs which are used to restore physiological functions in the cardiovascular, renal, respiratory, digestive and peripheral nervous systems;

- 4) demonstrate an understanding of the use of drugs to control inflammation and immune response or to kill bacteria, viruses, or malignant cells;
- 5) apply the basic principles that concern the absorption, distribution and elimination of drugs to predict the time course of drug concentrations in the body.

### **Teaching**

Lectures, supervisions and practicals

### **Assessment**

Essays MCQs and data handling and analysis

## **MVST IB Comparative Vertebrate Biology (CVB) (Vets only)** **(2<sup>nd</sup> Vet MB/Tripes)**

This course is run by the Department of Physiology, Development and Neuroscience.

### **Aims**

- 1) to complete the systematic biology covered in the Veterinary Anatomy and Physiology core course with essential biology of the mammalian head;
- 2) to provide an overview of the anatomy, and some physiology, of birds of veterinary importance;
- 3) to present introductions to the remaining vertebrate classes of fish, amphibia, reptiles and some of the more exotic domestic animals such as elephant, camels and llamas.

### **Objectives**

- 1) to introduce the study of pain from a cellular and molecular, systems and clinical point of view;
- 2) to stimulate interest in the topic and to encourage discussion in class;
- 3) to encourage students to pursue their reading and thinking to a level beyond that covered in the lectures;
- 4) to emphasize that our knowledge is not complete, and to point out some of the major gaps which it is hoped that some of those in the audience may be stimulated to fill in future scientific investigations.

### **Teaching and Learning methods**

Lectures, practicals (including live anatomy) and supervisions.

### **Assessment**

Short notes, steeplechase and essays.

**MVST 1B Options (Medics only)**  
**(Tripos)**

In addition to the core courses, students have the opportunity to study two options, one from List 1 and one from List 2, as follows:

**List 1**

**Clinical and Applied Physiology**

(Department of Physiology, Development and Neuroscience)

This course examines the pathophysiology of certain physiological systems covered in Homeostasis 1A in some important and common diseases, and the integrated responses to extreme environmental challenges in health. The course covers diabetes mellitus and the adrenal cortex, and looks at the responses of the body to extreme conditions presented by life in the arctic and the desert, during space flight, and when diving, dieting and starving.

**Experimental Psychology**

(Department of Experimental Psychology)

This course presents a range of explanatory frameworks for understanding phenomena such as consciousness, attention, memory and language. It provides an opportunity to evaluate the strengths and weaknesses of various interpretations in the light of empirical data.

**Infectious Diseases and host pathogen interactions**

(Department of Pathology)

This course builds on basic knowledge of the bacteria, viruses and parasites taught in Part IB Biology of Disease. It aims to introduce students to several major current issues in microbiology that impact on the health of man taking a molecular approach to the study of infectious agents and their pathogenesis. A range of modern techniques and their applications for the study of bacteria, viruses and parasites are introduced.

**Use and Abuse: Pharmacology of Janus Drugs**

(Department of Pharmacology)

This course looks at the physiology and pharmacology of pain and pain relief, together with the neurological and molecular bases of addiction. Substances covered include CNS stimulants, narcotics, cannabis, anabolic steroids, and the mechanisms underlying addiction and motivation for substance abuse.

**List 2**

**Developmental Biology : Concepts to Clinic**

(Department of Physiology, Development and Neuroscience)

The course aims to provide a basic understanding of the principles of human development, morphogenesis and growth; how abnormal developmental processes may occur; and the clinical and social implications of certain commonly encountered forms of abnormal human development.

**Man, Molecules and the Environment**

(Department of Pharmacology)

In clinical practice, the adverse "side-effects" of drugs are a constant problem requiring practitioners to make continual risk/benefit analyses when prescribing drugs. The aims of the course are to provide an introduction to the variety and nature of these adverse effects.

### **Sensorimotor Neurobiology**

(Department of Physiology, Development and Neuroscience)

This course aims to provide students with an understanding of the mechanisms by which sensory information is acquired and analysed within the nervous system, and its use in the control of movement.

### **Tumour Biology**

(Department of Pathology)

This course aims to give experience in reading, evaluating and communication primary evidence that supports major concepts in biology. Course material consists of a set of original papers, preselected by the course organisers to exemplify important advances in topics such as cancer epidemiology, molecular carcinogenesis, tumour progression and metastasis, heritable susceptibility, and screening for preneoplastic states.

### **Teaching and Learning methods**

Lectures, seminars and practicals.

### **Assessment**

Unseen essay paper.