The aim of the module is to enable the candidate to extend and consolidate clinical knowledge and skills gained at undergraduate level, and to develop an in-depth understanding of the application of that knowledge in a practice environment in relation to Veterinary Diagnostic Imaging.

AREA COVERED
The module is focused on taking images (radiography) rather than interpreting images (radiology), which is the concern of the other Veterinary Diagnostic Imaging C modules 2-5.

The module is aimed at veterinary surgeons in private practice or at a veterinary school at which 500 or more cases are radiographed per annum and where the candidate is responsible for radiographing at least 250 of those cases.

The module may be taken from a large animal or a small animal perspective, or a mixture of the two. It is suggested, if candidates are intending to proceed to a Certificate in Advanced Veterinary Practice (Veterinary Diagnostic Imaging) via modules C-Veterinary Diagnostic Imaging 2 and 3 (small animal options), that candidates will present a C-Veterinary Diagnostic Imaging.1 module made up of 80-100% small animals. Alternatively, if candidates are intending to proceed via C-Veterinary Diagnostic Imaging modules 4 and 5 (large animal/equine options) that candidates will present a C-Veterinary Diagnostic Imaging.1 module made up of 80-100% large animals.

This module is mandatory for those aiming to achieve the Certificate in Advanced Veterinary Practice (Veterinary Diagnostic Imaging).

LEARNING OBJECTIVES
Candidates must demonstrate:
- The development of good radiographic practice in relation to the safety of patients and personnel, positioning, processing and image quality
- The ability to apply diagnostic imaging techniques appropriately as part of the overall investigation of a case
- The ability to reflect on their practice and improve their technique with experience.
ASSESSMENT STRATEGY FOR THIS MODULE

It is suggested that this module could be assessed by the following methods:

- A **case log**, which documents a total of 500 cases taken by the candidate over the period that the module is being completed. An example of the appropriate information to be included in the case log is attached as Annex A.

- A **case book** of ten cases, each of up to 500 words in length. These cases should be selected by the examiners from the case log and include an appropriate balance of bone and soft tissue cases, and plain radiography and special techniques. The latter should include cases with special radiographic projections, contrast studies, and ultrasonography.

The case reports are intended to illustrate good radiographic practice. Therefore, it is suggested that they are structured as follows. A maximum of 100 words might be used for a brief description of the important radiological features, leading to a radiographic diagnosis and the final diagnosis for the whole case. This would be similar to a report which those storing hard copy in manilla envelopes might insert with these films.

In addition, within the remaining 400 words, candidates should comment on film quality, relating to positioning, processing and contrast/definition if any of these is a problem. They should also comment on the relevance of radiography to the case (a key part of the diagnosis or “icing on the cake”?), and the relevance of other diagnostic imaging techniques used and how these complemented radiography. This could lead into an overall conclusion of the value of radiography for the patient and also the client, i.e. was it justified from the point of view of investigation of the disease (patient) and also economic costs (client). Finally, the candidate should indicate lessons learnt from the case, and how things could be improved in a similar future study.

MODULE CONTENT

At the end of the module, candidates should be able to:

- Produce **good quality radiographic images** through a comprehensive knowledge of: exposure assessment; the factors influencing the choice of kV, mA, time, film type, use of grid, etc; formation of technique charts; correct positioning of patients, and the limitations that may be imposed in domestic animals; the need for compliance with “The Ionising Radiations Regulations 1999”; the need for restraint using appropriate methods, including the advantages and disadvantages of the use of sedation and anaesthesia.

- Ensure satisfactory **radiation protection** – the relevant legal requirements including familiarity with the current “Guidance notes for the protection of persons against Ionising Radiations arising from veterinary use”, the risks involved in the use of radiographic procedures; the methods which can be used to minimise these risks; hazards arising from poor design of X-ray rooms; the control of hazards arising from secondary radiation; the correct use of protective aprons.
and gloves; familiarity with current radiation monitoring services; the instruction of lay staff in radiation discipline.

- **Use contrast media** appropriately, through an understanding of the nature of the more frequently used media and indications for their use; the procedures for performing basic contrast techniques.

- Understand the principles and apply **diagnostic ultrasonography** in veterinary practice – physical principles of ultrasound; image production; display modes; artefacts; normal ultrasound appearance of the major organs (heart, liver, kidney, spleen, bladder, prostate and uterus); recognition of major alterations to the normal architecture of these organs and the possible diagnostic significance of these changes.

- **Identify and process films** and recognise faults due to defects in processing and film handling;

- Recognise faults due to **inadequate radiographic procedure** and how these affect image density, contrast and sharpness.

- Recognise and describe **normal radiographic anatomy**. (Candidates should possess a detailed knowledge of the normal radiographic anatomy of the dog, cat and horse and of their variations with breed and age, as appropriate to the case log. In other species a knowledge compatible with current use would be expected.)

- Apply the **principles of radiological interpretation** – the recognition of tissue types; formation of shadowgraphs; effects of superimposition and multiple shadows. Changes in opacity, size, shape, position and function of organs. The use of simple positional and contrast aids to elucidate radiographic problems. The applications of these basic principles to the evaluation of radiological signs in relation to clinical problems.

**COMMENTARY ON THE CONTENT**

Interpretation applies to the diagnostic radiological features of the more commonly encountered clinical conditions seen in veterinary practice:

**Digestive system** Common abnormalities affecting the teeth, pharynx, oesophagus and gastrointestinal tract. Obstructive lesions and functions disturbances. The significance of gas shadows. The use of contrast media. Differential diagnoses.

**Abdomen** Recognition of changes in outline, position and opacity of organs. Abdominal masses and displacements caused by them. The presence of free gas or fluid. Differential diagnoses.

**Urogenital System** Common abnormalities affecting the kidneys, ureters, bladder, urethra, male and female genital organs. Intravenous urography, retrograde, cystography and urethrography (positive and negative). Differential diagnoses.
Cardiovascular System  Common abnormalities affecting the heart and blood vessels and evidence of cardiovascular disease which may be recognised on plain films. The principles of cardiac catheterisation and angiocardiology. Differential diagnoses.


Axial Skeleton and Central Axial Nervous System  Common abnormalities affecting the skeleton and the central nervous system. Fractures, dislocations, congenital and developmental abnormalities. Degenerative conditions. Inflammatory and neoplastic changes. The principles and problems associated with the use of contrast media to demonstrate lesions of the brain and spinal cord.


Special techniques  Candidates should be familiar with the general principles of contrast examinations and the performance and interpretation of the more commonly used techniques. They should understand the principles of fluoroscopy with image intensification and Doppler ultrasonography including colour flow and the types of conditions in which these techniques may be usefully employed.

Note on cases:
The scope of the examination is related to those conditions likely to be encountered in general veterinary practice. Therefore, in selecting cases for the 10 reports, examiners will be choosing these rather than those with detailed recourse to specialist techniques more appropriate to Diploma examinations.