

Research Design and Methods

Overview

This module will enable you to undertake a research project, with an appropriate study design to validate a hypothesis and analyse the data, including the presentation of results and writing a grant application.

Subject areas: introduction to scientific research and how to formulate a hypothesis; literature search, critical analysis of papers and writing a scientific review; experimental and statistical design in project planning; project management; preparing data for analysis - qualitative data, quantitative data; statistical analysis and analysing the validity of findings; report writing, presentation of data and writing a scientific paper; introduction to grant application writing, planning the project and budget; guidelines to writing a good grant proposal.

Welcome to the course

Research Design and Methods is an optional course of the Veterinary Epidemiology and Public Health programme and the Livestock Health and Production programme of the Royal Veterinary College. It may also be studied as a 240-hour Individual Module.

What will you learn from this course?

By the end of this course you should be able to:

- explain the importance of hypotheses in modern scientific thinking
- attempt a literature search and compile a reference list or bibliography
- critically appraise scientific papers and write a literature review for a thesis or a dissertation
- list and explain the main study designs, explain the process of sample size determination and calculate sample size for a basic study design
- describe the research project cycle and illustrate the use of logical frameworks in research project development
- plan and organize the practical execution of your research project and develop time management and necessary organization skills
- construct a paper from your research
- decide upon the appropriate type of funding to be applied for, based on your research topic and career, and prepare a grant application.

Course structure

The course consists of eight units of study, all of which you should complete. They make up the following three modules.

Module 1: Research Methods and Design

This module (Units 1–4) is designed to help you develop the skills you require as you begin your project. It is quite important that you spend some time carefully constructing your hypothesis, on which you will base your research project. Therefore, the module begins by describing the process of formation and testing of hypotheses. Literature searching is described in detail giving you an opportunity to explore some of the methods described in Unit 2. Being able to critically appraise scientific literature is another important skill, and in Unit 3 of this module a structured framework to assist in critically appraising scientific papers will be presented. The final part of the module focuses on study design and how to plan a research project.

Module 2: Research Management and Implementation

The second module (Units 5 and 6) aims to give you a basic understanding of the processes, methods and terminology used in developing, managing and implementing projects, with particular emphasis on research project management at a practical level. It includes the concepts, processes and details of developing logical frameworks to monitor activity and resource schedules. The methods and the necessary management skills to progress projects in the field and laboratory are described.

Module 3: Presentation of Results and Writing Grant Applications

The final module (Units 7 and 8) introduces generic skills that are necessary in writing scientific reports and grant applications. The publication of papers and scientific reports is essential to disseminate the results of your project and to enable your work to become known in the scientific field. Scientific writing is introduced with details on how to construct a paper. In the final part of the course the grant application process is described in detail and some useful guidance on how to write a good application is outlined.

Study time

The entire course, including revision and examination, is designed to take approximately 240 hours to complete. This is made up of approximately 90 hours' study time for Module 1, about 50 hours for Module 2 and 30 hours for Module 3 (170 hours in all); approximately 20 hours for the TMA(s); and the remaining time for personal study and revision. You may find that some units will take you more, or less time, than estimated, depending on your familiarity with the subject.

Tutor-marked assignments

In addition to your work on the eight units, you are required to complete and submit at least one tutor-marked assignment (TMA) for assessment. If you submit more than one – and you may submit up to two – your best TMA will be used in the calculation of your final mark. Full information on how to approach and submit TMAs is provided in the Programme Handbook and in the assignments themselves. You should bear in mind that your TMA will count for 20 per cent of your final mark for the course.