Equine Science Education in the UK

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Introduction

Equine Science Education in the UK, apart from traditional veterinary education, includes a wide range of College and University courses. Foundation degrees (FdSc), Bachelor of Science (BSc) degrees or BSc (Honours) and more recently a range of Master of Science degrees (MSc) are on offer under equine titles such as Science, Sports Science, Equine Breeding and Stud Management or Behaviour and Welfare. This paper introduces the various courses on offer and highlights subject areas covered which form part of equine science education in the UK.

Defining Equine Science Education

For the purpose of this paper the term 'Equine Science Education' relates to all courses which are offered at post-compulsory level and which are science-based (including elements of biology, physics, chemistry, mathematics or biomedical science). The range of qualifications and related courses available within the UK education system are listed in Table 1.

Table 1 Overview of Qualifications currently available within Equine Science Provision

Course Title and level	Age Range – Entry level	Duration	Example of Courses
National Diploma (ND) (equivalent to A-level education)	16 - 18 years, achieved limited GCSE's	2 years full time	National Diploma in Horse Management
Foundation Degree – Science based (FdSc) (equivalent to 2nd year degree level following a short bridging course)	18 onwards GCSE's with industrial experience, or A-levels	2 years full time	FdSc in Horse Management and Training FdSc in Equine Science
Bachelor of Science (BSc) (Honours – or optional without honours) (equivalent to University degree, with 'Honours' half a level towards European Masters)	18 onwards Entry level equivalent to at least 3 A-levels	3 years full time	BSc (Hons) Equine Science BSc (Hons) Equine Sports Science (ESS); BSc (Hons) ESS -Equestrian Psychology BSc (Hons) Equine Dentistry BSc (Hons) Equine Breeding and Stud Management
Master of Science (MSc) (post-graduate, Masters degree) Optional – Postgraduate Diploma (12 months)	Graduates (BSc's), or Professionals with several years research experience in industry	18 months	MSc Equine Science MSc Human and Equine Sports Science MSc Equine Business Management MSc Animal Manipulation
Master of Philosophy (MPhil)	Post graduates (BSc, Honours)	12-18 month	Research based
Doctor of Philosophy (PhD)	BSc (honours) via MPhil to Phd	3 years minimum	Research based

From September 2005 a total of 118 equine university courses will be offered, of which 45 are science based, at 33 different institutions. The diagram below illustrates the general progression routes from further education to higher and postgraduate education (Figure 1).

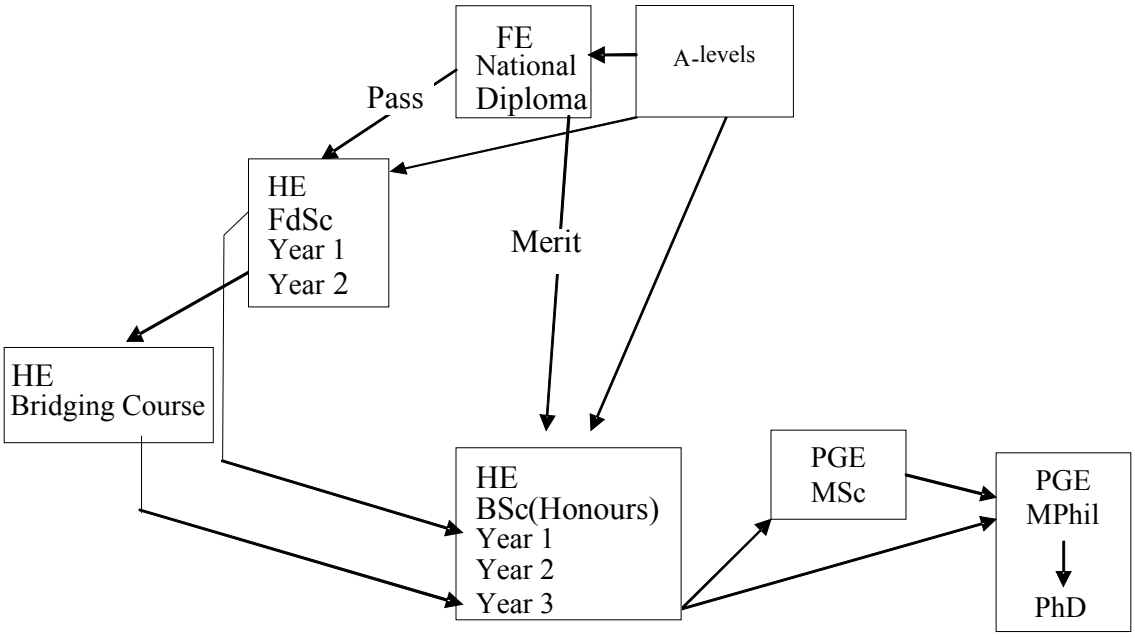

Figure 1. Progression routes describing pathways from Further Education (FE) through to Higher Education (HE) courses and Post Graduate Education (PGE) (at FdSc level Higher National Diploma (HND) can also be entered.

Characteristics of Equine Science Education in the UK

Equine science education has grown considerably in the past 15 years offering many land-based colleges an opportunity to diversify into other areas, as requirements for agricultural education declined. Nearly all courses continue to incorporate practical skills and work based learning while focusing on science education. Alternative courses combine practical skills with business management and marketing.

National Diploma (ND, equivalent to 2 or 3 Science A-levels)
At this level students receive basic science education, studying biology and bioscience subjects which are related to horses such as: Nutrition, Anatomy, Microbiology, Equine Husbandry and Management and Equine Health. In addition students are required to carry out yard duties on a regular basis, for which they are assessed. Practical Equitation is very much part of this course with riding instruction in dressage and show jumping. Students are trained towards taking British Horse Society exams on 'Horse Knowledge and Care' as well as 'Riding' which lead to riding instructor qualifications from assistant to intermediate instructor to Fellowship of the BHS. Academic studies are based in the classroom but also incorporate practical sessions on the yard. Assessment involves practical assessment with horses, assignments and written reports or presentations as well as written exams.

Foundation Degrees in Science (FdSc)
Foundation degrees were launched as a modern, employment-related, vocational higher education qualification. These courses are relatively young, often replacing the old Higher National Diploma courses, which in most cases involved a sandwich year of work experience (and thus lasting 3 full years in total). The first FdSc course in the UK was run at Brackenhurst Campus of Nottingham Trent University (NTU) in 2001.

Foundation degrees incorporate equitation and stud management as well as work-based and industrial learning experience and focus on combining science based knowledge with practical application. Students can also attend part time on a day-release basis while working in the equine industry. These courses encourage strong industrial links and give students short quality industrial experiences, which cover very specific tasks and work-based activities. These are assessed with the help of professionals from the industry and help to improve the work providers' understanding of the students level of skills and knowledge. Students, while studying academically are also provided with the opportunity to network and build their own relationships within the industry.

Table 2 below gives an example of modules available on the FdSc Sports Horse Management and Training course run at NTU.

Table 2 Modules taught on the FdSc Horse Husbandry and Management at NTU

Year 1	Year 2
Equestrian Sports Psychology	Sports Injury
Nutrition for Sports Horses	Breeding Sports Horses
Bioscience	Veterinary Science
Anatomy and Physiology	Equitation Theory
Working Horses from the Ground	Training the young horse
Teaching Theory and Practice I	Teaching Theory and Practice II
Equitation	Advanced Equitation
Graduate Skills	
Sports Horse Management	Competition Horse and Competition Management

Bachelor of Science Courses (BSc Honours)

The equine industry has grown considerably over the past 20 years requiring increased professional and scientific input. Reflecting these requirements a wide range of courses at BSc level are now available, the majority of which are run under the titles of Equine Science or Equine Studies. Innovative recent degrees incorporate human sports science and the horse-human relationship, such as the BSc in Equine Sports Science - Equestrian Psychology which first was offered in 2003 at NTU. Another novel development due to industry demand is a BSc in Equine Breeding and Stud Management offered at Writtle College and the BSc in Equine Dentistry now offered at Hartpury College.

In the third year of BSc (Honours) courses, students have to conduct their own dissertation project and are encouraged and supported to do original research. Many institutions provide adequate facilities, with an acceptable number of horses which are available for such projects but in particular close links with Veterinary Universities and Research Institutions such as the Animal Health Trust offer further opportunities to carry out scientific research within larger projects. Examples of dissertation projects include the following studies, which made it to the Dissertation of the Year final in 2004 (from around 250 dissertations entered):

- Caddick, J. (2005) An investigation into the effects of a single impact load on equine articular cartilage explants, *Nottingham Trent University*
- Moore, R. (2005) Evaluation of hair analysis for the retrospective detection of senecio alkaloid toxicosis in equines, *Writtle College*
- Strange, M. (2005) Identification and quantification of amino acids in horse feeds aimed at two opposing disciplines, *University of Lincoln*

- Hayward, K. (2005) Further validation of the phenylepherine eye drops test as a diagnostic tool in equine grass sickness, *Warwickshire College*

On these courses around 6-9 modules (depending on institution and weighting of modules) are taken per year. Table 3 below provides a range of modules taught on BSc Equine Science courses, which highlight the depth and breadth of equine science education. Although the majority of course content is academically based, students still have to perform yard duties and have the choice of an advanced equitation course at many institutions. Practical stable management and horse husbandry is also taught at most institutions to a very high level in addition to the required academic modules. Some institutions offer extensive experience in specialist areas such as stud management, providing small stud yards, which are often run commercially, while others specialise in providing competition level riding education. At a limited number of institutes a choice of both is available.

Table 3: Modules taught on BSc Equine Science courses (samples taken from: Writtle College, NTU and Hartpury College)

Year 1	Year 2	Year 3
Bioscience	Training the young horse	Genetics and Selection
Graduate Skills	Reproductive Physiology	Dissertation
Nutrition for Sports Horses	Sports Injury	Biomechanics and Locomotion
Sports Horse Management	Veterinary Science	Exercise Physiology
Horse Behaviour and Welfare	Breeding	Drugs and Performance
Anatomy and Physiology	Advanced Equitation	Energetic Basis of Performance
Equitation I	Experimental Design	Alternative Therapy and Rehabilitation
The Horse Human Relationship	Competition Horse and Comp Management	Assessment of Equine Behaviour
Horse Husbandry and Management	Research Skills	Sports Psychology
Coaching Theory I	Statistical Analysis	Metabolism and Biotechnology
Equine Evolution and Domestication	Equine Dental Instrumentation	Equine Dentistry I and II
Equine Dental Disorders	Dental Pathology and Diagnosis	Advanced Dental Procedures
Introduction to Dentistry and Instrumentation	Animal Microbiology	Applied Behaviour and Welfare
Learning Methods	Equine Health Management	Equine Microbiology and Immunology
Parasitology	Business Management	Sports Medicine
Stud Practical Skills	The Stud Industry	Nutrition and Feed Technology
Event Management	Computer Aided Design	Ethics and Welfare
	Equine Performance	Equine Breeding Systems
	Nutrition	Animal Growth and Development
	Grassland Science and Production	

Job Opportunities for Equine Science Graduates

Some graduates progress into postgraduate education, while many find work within the continuously expanding UK and international equine industry (Table 3). Institution surveys have shown that graduates will gain full time employment shortly after completion of their degrees, although not always directly in the equine industry or ancillary areas.

Table 3: Destination of leavers from BSc Equine Science Courses

Postgraduate studies	Equine Industry employment – specialist areas:	Equine Business
Veterinary training; MSc Equine Science, related Animal Science MSc's; MPhil or PhD Research students; MSc Physiotherapy; Therapy Courses; McTimothy therapy	Medical sales, Insurance, Equine related Law, Charitable Societies and Governing bodies, Equine Journalism, Coaching, Lecturing, Nutritionists, Racing Industry, Rural Development,	Equine related tourism, Equine Consultancy, Rehabilitation, Sports Psychology, Competition Training, Sports and Leisure Industry, Nutrition advice, Yard Managers

Postgraduate Education

From the above table it can be seen that a small percentage of graduates opt for the path of postgraduate education to further specialise within their chosen area. A considerable range of MSc degrees which are directly linked to equine science education are now available (Table 4). MSc education in the UK has to be paid in fully by the student and many students therefore are either mature students, which carry out further studies part time or which have come back from the industry to improve their career chances through further studies. These courses are also popular with overseas students. The final third of a full Masters course comprises of an in depth research project, which must contain original research and which is written up in form of a thesis.

Table 4: Titles of MSc courses currently available which allow specialism in equine science

MSc Equine Science (at 4 Institutions)
MSc Equine Business Management
MSc in Human and Equine Sports Science
MSc by Learning Contract/M.Phil/PhD in Equine Science
MSc/Diploma in Applied Animal Behaviour & Animal Welfare
MSc by Learning Contract PhD/MPhil in Animal Behaviour and Welfare
MSc/Postgraduate Diploma in Veterinary Physiotherapy
MSc/Postgraduate Diploma in Animal Production & Nutrition
MSc in Companion Animal Behaviour Counselling
MSc/Postgraduate Diploma in Animal Manipulation

Conclusion

Equine Science Education has been developed to a very high grade in the UK and questions about sustainability have been asked throughout this process over the past 10 years. Nevertheless the demand for such education has continuously increased. The equine industry has benefited from better qualified and well educated staff. This has contributed enormously towards the dissemination of new knowledge and information from a scientific level to the end user – the horse rider and manager. The welfare of sports horses has thus increased over the last decade and will further benefit from the new trend in equine science education, which incorporates mental (psychological) as well as physiological requirements of the animal.

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