

BSc microbiology degrees in the UK

Liz Sockett

Entering stationary phase? Student recruitment

Liz Sockett takes a look at first degrees in UK universities, analysing the recruitment figures and checking out their course content.

An interrogation of the UCAS statistics for 2001 (www.ucas.ac.uk) reveals 199 UK first degree programmes that include the word 'microbiology' in their title, of which 51 are single-subject microbiology degrees. In the remainder microbiology is offered in combination with subjects including French, German, psychology, computing, food science, immunology and ophthalmic dispensing. The range of UK institutions offering these degrees is shown in Fig. 1. Some others, not listed, offer microbiology within biotechnology programmes.

Despite the plethora of institutions offering degrees, the total number of students entering bachelors degrees with a C5 microbiology code in the UK is only around 500. As the histogram in Fig. 2 illustrates, this number is similar to that for genetics, but considerably less than for biochemistry, chemistry and biology degrees. As Fig. 2 shows, recruitment to microbiology degrees is approximately one-quarter of that to media studies degrees. If only microbiological media were as attractive as the news media!

As can be seen in Fig. 3, recruitment onto microbiology degrees has remained steady or even slightly increased over the last 5 years with the exception of 2000 where a downturn was experienced. Whether the 2000 figure turns out to be an anomaly, only time will tell. The picture is similar for biochemistry and genetics degrees. For degrees in biology and chemistry a moderate downturn in recruitment is seen, but this is from a pool of student places that is eight to ten times bigger. This recruitment picture is set against an approximately 7% increase in total student numbers entering university



over the same 5 year period. The comparative figures for media studies help to explain where those students are going.

What these recruitment figures clearly show is the value of explaining the interesting careers that a degree in microbiology offers to even a small group of local school pupils. Speaking to just five pupils one could be addressing 1% of all entrants to microbiology degrees in a year! The SGM External Relations staff put a great

deal of effort into attending careers fairs for pupils who are deciding which GCSEs to take or which degree to study. Our careers leaflets and posters, *Microbiologists make a difference!* (as shown above), explain which school subjects give pupils access to microbiology degrees and dispel some of the specialization myths that abound. All SGM members running any sort of schools open days are welcome to have a supply of the leaflets by contacting careers@sgm.ac.uk

Once again we are all busy with our research but taking time to do a bit of recruiting for our subject is a positive alternative to bemoaning the paucity

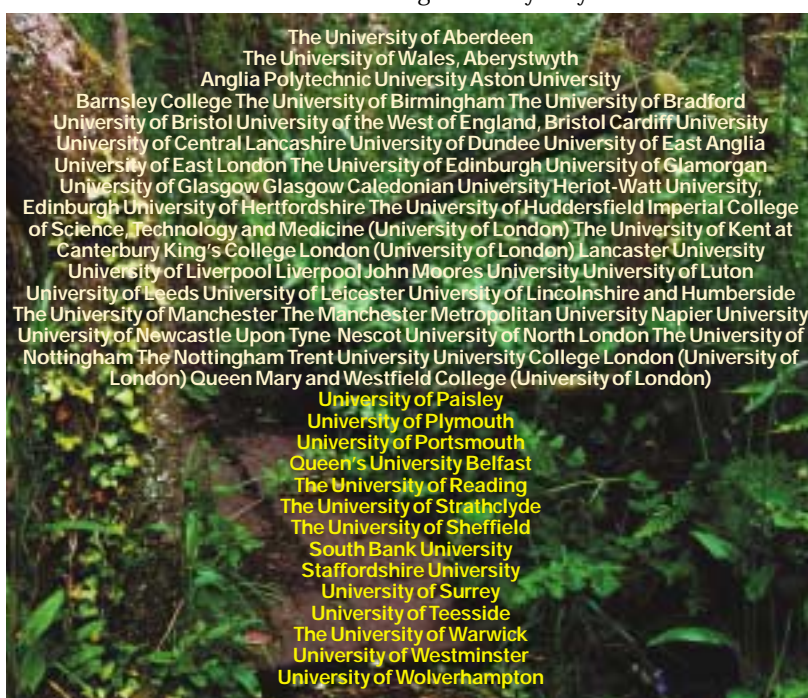


Fig. 1. Mushroom diagram of UK universities offering degrees containing microbiology.

BSc microbiology today

Fig. 2. Number of 'degree accepts'*

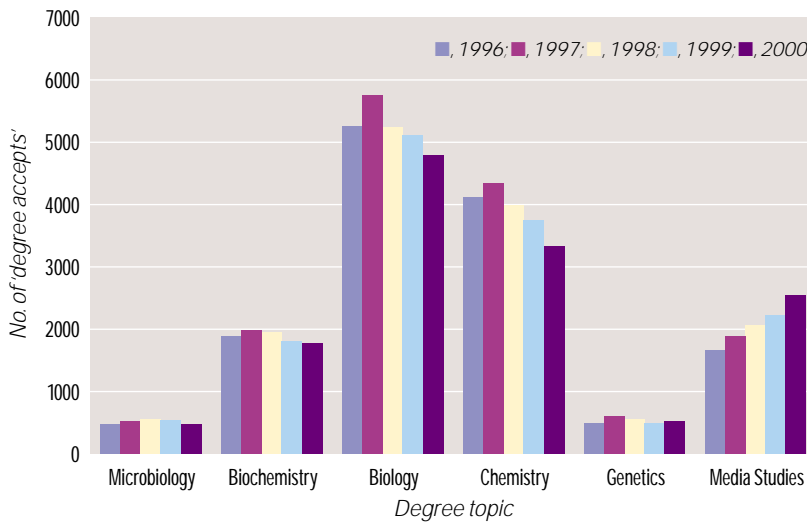
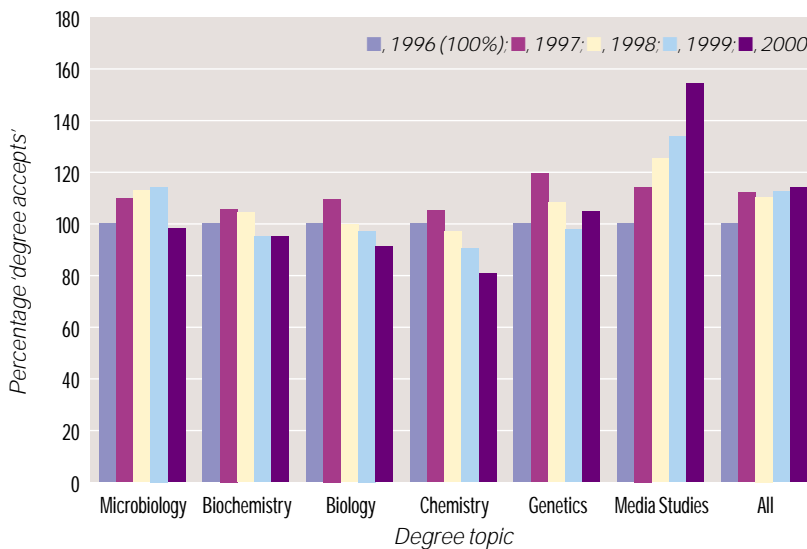


Fig. 3. 'Degree accepts' as a percentage of 1996 numbers*



*Source: Higher Education Statistics Agency. The figure of 'degree accepts' shown in Figs 2 & 3 above represents those applicants who firmly accepted an offer to do a microbiology degree and then made the grades required by their offer.

of postgraduate and postdoctoral applicants that we receive when advertising our research posts! I am well aware that issues of temporary contracts and salaries that are adequate rather than meteoric do make microbiology careers harder work than maybe those in media studies. However, the exciting and sometimes threatening challenges that bacteria and viruses are constantly presenting to our society need an army of well-educated graduate microbiologists to tackle them. Otherwise we may no longer be around to read the papers that the media studies graduates produce!

Microbiology can encompass a diverse set of subjects and the content of microbiology degrees depends upon the research interests of the academic staff and upon the requirements for co-teaching of classes with other bioscience students, especially in the early years. As we are specializing in microbiology education in this issue of *Microbiology Today*, I have tried to compile a very small snapshot of degree content kindly supplied to me by some members of SGM Council. The degree courses were chosen purely arbitrarily based on the supply of usable material to me. I do not provide these data as any sort of statistically reliable view of current BSc microbiology courses, but it strikes me that as an educational community, we know little of the diversity of degree courses in our neighbours' institutions. Further surveys of degree course content in all institutions can be found in the *CRAC Degree Course Guide: Microbiology, Immunology and Biotechnology* and I will not be volunteering to expand upon the tables presented here!

Although the snapshot is very small and does not include a diversity of old and new universities, it is good to see that the research project and literature review, or dissertation, are alive and well. It is also interesting to note the varying levels of provision made for mycology in different degree schemes, supporting the comments made by Professor Tony Trinci about the dearth of university mycologists in the August 2000 issue of *Microbiology Today*. In addition we can see that some universities have already decided to incorporate bioethics or microbiology and society modules into their degree courses. With pressures for transparent public accountability in scientists rising, this may be a trend that is set to continue. Interestingly, training in ethical issues is listed in the draft *Bioscience Benchmark*.

Another feature of the degree schemes is the reassuringly high microbiology content. With the amalgamation of many former microbiology departments into super-schools of molecular biology or life and health sciences, it is pleasing to see that a BSc in microbiology has not become simply a degree in molecular biology with slight lip-service paid to the organisms in which genes are manipulated. Molecular biology techniques are very useful, but in the post-genomic era, now that we are trying to assign function to gene products, we need young scientists who can understand the diverse physiologies, behaviours and community interactions of micro-organisms. While on the subject of microbial communities, it is interesting to note that not many of our snapshot courses explicitly teach biofilm biology – a shortcoming identified in American degree courses that was addressed by visiting ASM members Bill Costerton and John Lennox at an evening educational workshop at the Exeter SGM Meeting in 2000. Maybe our biofilm biology is embedded into relevant courses on medical and environmental microbiology.

Liverpool BSc Microbiology	Nottingham BSc Microbiology	Manchester BSc Microbiology	Sheffield BSc Microbiology	Edinburgh BSc Microbiology/Medical Microbiology
Year 1 Core	Year 1 Core	Year 1 Core	Year 1 Core	Year 2 Core*
Cells	Genetics & Cell Biology	The Cell	Molecular Biology of the Gene 2x	Cell Metabolism & Regulation 2x
Molecules	Industrial Applications	Biotechnology	Microbes in Medicine & Industry 2x	Microbes, Cells & Immunity 2x
Diversity & Evolution	Foundation Science	Genetics	Genetics 2x	Genes & Gene Action 2x
Biochemistry	Biochemistry	Biochemistry	Biochemistry 2x	Equivalent of six 1x courses from these OPTIONS:
Four OPTIONS from:	Food Manufacture, Nutrition & Health	Bacteriology & Virology	Two OPTIONS from modules in:	Biometrics 2x
Chemistry	Virology	Molecular Biology	Biology	Evolution in Action 2x
Environment & Humanity	Microbes & Disease	General Chemistry	Physics	Animal Biology 2x
Immunology	Food Safety	Biomaths	Chemistry	Plants, Fungi & Symbiosis 2x
Genetics of Higher Organisms	Microbial/General Genetics	Tutorial Units	Two OPTIONS from:	Chemistry for Life Sciences 2x
Ecosystem Ecology	Metabolism/Biochemistry	One from many OPTIONS, including:	Unrestricted choice of modules to fit timetable	Global Environmental Processes 2x
Cell to Multicells	Data Analysis/Presentation	Diversity & Evolution		
	Whole Organism Biology	Animal Designs		

Liverpool BSc Microbiology	Nottingham BSc Microbiology	Manchester BSc Microbiology	Sheffield BSc Microbiology	Edinburgh BSc Microbiology/Medical Microbiology
Year 2 Core	Year 2 Core	Year 2 Core	Year 2 Core	Year 3 Core
Biotechnology	Medical Microbiology	Bacterial Infection & Host Immunity	Environmental Micro	Microbiology 3x
Microbial Physiology	Microbial Physiology		Microbial/Human Disease	Medical Microbiology 3x
Parasitism/Symbiosis	Plant Pathology	Parasitology (molecular)	Practical Molecular Biology	Microbial Biotechnology 3x
Microbial Genetics	Food Borne Pathogens	Gene Mobility/Maintenance	Molecular Biology Techniques	One OPTION from:
Virology	Dissertation	Tutorial Units	Microbiology Practical	Immunology 3x
Microbes & Environment	Applied Mycology	Fungal Diversity & Physiology	Microbe Structure Function/Growth	Molecular Biology & Genetics 3x
Human & Plant Pathogens	Microbial Fermentation	Structure/Function of Microbes	Gene Expression & Regulation	Molecular Cell Biology 3x
One OPTION from:	Five OPTIONS from:	Four OPTIONS from:	Microbial Energetics	
Genetic Analysis	Plant Biotechnology	Gene Expression	Four OPTIONS from these or other modules:	
Evolution	Bioethics	Immunology	Practical Biochemistry	
Population Ecology & Pest Control	Chemistry of Macromolecules	Commercial Exploitation of Plants	Struct. & Funct. of Macromolecules	
Molecular Biology	Bacterial Genes/Development	Genetic Engineering	Biological Membranes	
	Food Preservation	Plant Pathology	Biological Messengers	
	Computing	Biomaths	Eukaryotic Genetics	
	Practical Plant GM		Metabolism Control/Manipulation	
	Molecular Evolution		Microbial Genetics	

Liverpool BSc Microbiology	Nottingham BSc Microbiology	Manchester BSc Microbiology	Sheffield BSc Microbiology	Edinburgh BSc Microbiology/Medical Microbiology
Year 3 Core	Year 3 Core	Year 3 Core	Year 3 Core	Year 4 Core
General Microbiology	Project Literature Review 2x	Dissertation	Library Project	Review Essay (Dissertation)
Research Project 2x	Research Project 4x	Research Project 3x	Research Project 2x	Research Project 3x
Five OPTIONS from:	Six 1x Courses from:	Molecular Virology	Microbiological Data Handling	Honours Year of Weekly Topic Blocks
Microbial Diversity	Biotechnology 2x	Virology Practical	Microbiology & Society	Prevention & Control of Infection
Molecular Microbiology	Microflora of Foods 2x	Four OPTIONS from:	Six OPTIONS from:	Microbiology Honours Practicals
Microbial Versatility	Plant-Microbe Interactions	Three Immunology Courses ± Microbiology or Parasitology	Microbial Sensing	Microbial Pathogenicity
Microbial Disease	Fermentation	Aquatic Microbiology	Animal Viruses	Special Topics in Microbiology
Biotechnology	Molecular Plant Pathology	Molecular Microbiology	Molecular Immunology	Honours Tutorials
Microbes & Environment Control	Industrial Appl. of Microbial Analysis	Advanced Infectious Disease	Photosynthetic Membranes	Cells Molecules & Nucleic Acids
	Bacterial Gene Expression	Cell Biotechnology	Fungal Genetics	
	Plant Disease Control	Medical Virology	Bacterial Differentiation/Genetics	
	Applied Mycology	Microbial Biotechnology	Bacterial Pathogenesis	
		Designer Molecules	Biotechnology Topics	

● Table Notes

Tables show only approximate degree contents as a great deal of information has been summarized to fit. I am grateful to colleagues for supplying module information and apologetic to those whose module book complexities defeated my tabulating powers!

'2x' indicates a module that is two times the length of others in that column. Options choice numbers relate to single size modules. Different degree courses operate difference course lengths within them and sometimes different course sizes across different years. Not recorded

on the tables is the option for students to take single external modules in languages, etc.

*Edinburgh runs to the Scottish 4 year system, so only the last 3 years of this degree are tabulated. The first year includes courses such as: origin and diversity of life, quantitative biology, physics in the life sciences, chemistry for life sciences, environmental and community biology, molecules and cells. As the table shows, many of these topics are covered in the English system in year 1.

In conclusion, I hope that the quality and diversity of microbiology degrees that we have in the UK will be maintained with the advent of degree-benchmarking and possibly entirely web-based degree courses. Maybe we should take another snapshot in a few years time to check?

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Further reading

CRAC Degree Course Guides: Microbiology, Immunology and Biotechnology 2001/2002.
Hobsons. Available from Biblios, Star Road, Partridge Green, West Sussex RH13 8LD (Tel. 01403 710851).