

Pre-Biomedical Scientist Program in the Biology Department at Winthrop University

INTRODUCTION

A Biomedical Scientist predominately works in a lab researching causes of diseases and/or developing strategies to diagnose, monitor and treat diseases. They can work in universities, hospitals, veterinary hospitals, forensics, government departments (e.g. the Center of Disease Control) or laboratories in industry (e.g. biotechnology or pharmaceutical companies). If working in a university or college, you may teach classes in addition to performing research. Although some jobs in this field simply require a Biology degree or a Masters, in most cases a PhD is beneficial for career advancement. Some biomedical scientists also hold a doctor of medicine degree (MD) or a doctor of veterinary medicine degree (DVM). If that is the path you choose to pursue, there are dual MD/PhD and DVM/PhD programs in the biomedical field.

You need a BS in Biology (or related science) with courses in biology, chemistry, physics, and math. To do a PhD or a Masters, most universities require students to take the Graduate Record Examinations (GRE) in order to apply. The core prerequisites are the same as for the regular Biology degree, but to apply for a Masters and/or PhD in Biomedical Science, it is advisable to focus any additional courses on medically inclined subjects (microbiology, immunology, cell biology, molecular biology). It is also important to demonstrate some research experience and aptitude, so being part of a professor's research team and/or taking one or more research-orientated classes is required. *

For the dual MD/PhD, students would need to take both the GRE and the MCAT entrance exams. For DVM/PhD programs, students need to take the GRE and some schools require an additional entrance exam, the VCAT.

COURSEWORK

The following are only guidelines; students should consult their advisors and programs of interest to plan their academic schedule.

Biology:

General Biology I and II with lab, research* labs are recommended (BIOL 220/222 or 220/270*, 221/223 or 221/271*)

Genetics (BIOL 316/317 – recommend 317)

Human Anatomy/Physiology/Microscopic Anatomy (BIOL 307/308/321)

*Research (BIOL 370, 371, 450, 470, 471, 472)

Microbiology (BIOL 310)

Cell Biology (BIOL 315); prerequisite for Immunology (BIOL 522 – spring semester course)

Biomedically-related specialty courses, which can include: Immunology (BIOL 522), Mechanisms of Disease (BIOL 519),

Current Methods in Microscopy (BIOL 530), Molecular Biology (BIOL 555), Bioinformatics (BIOL 560), Applied Micro (BIOL 526*), Human Genetics (BIOL 517), Cancer Biology (BIOL 532), Neuroscience and Disease (BIOL 539)

Area A (Eco/Evo)

Chemistry:

General Chemistry I and II with lab (CHEM 201, CHEM 202/204 or CHEM 211/204)

Organic Chemistry I and II with lab (CHEM 301, CHEM 302/304)

Biochemistry (CHEM 323, 520 or CHEM 523/525)

Math:

Mathematics (MATH 150/151)

Statistics (MATH 141/241 or 341)

Calculus (MATH 105 or 201)

Physics:

Physics (PHYS 201/202 or 211/212)