Curriculum in Cell/Molecular/Biotechnology

CourseCourse NameCrCourseCourse Name23-101General Biology I423-102General Biology II24-101General and Analytical Chem. I424-102General and Analytical01-101English Composition I301-102English CompositionSocial Science325-122Trigonometry23-191University Seminar I123-192University Seminar II23-191University Seminar I123-194Intro. to Biology ProfesTotal Credits 15ToSophomore Fall SemesterSophomore Spring SCourseCourse NameCrCourse Name23-215Cell Biology423-210Genetics24-301Organic Chemistry I424-302Organic Chemistry II16-100Fitness and Wellness2Literature23-261Calculus for Life Sciences423-221Biostatistics01-200Speech323-29Soph. Seminar ? Sci. ITotal Credits 17Total Credits 17Total SemesterJunior Spring SerCourse Name23-310Molecular Biology424-403Biology Elective423-422Biochemistry OR23-310Molecular Biology424-403Biochemistry OR23-310Molecular Biology424-403Biochemistry OR23-311Fundamentals of Physics I <td< th=""><th></th><th>Freshman Fall Semester</th><th></th><th></th><th>Freshman Spring Semester</th></td<>		Freshman Fall Semester			Freshman Spring Semester	
23-101 General Biology I 4 23-102 General Biology II 24-101 General and Analytical Chem. I 4 24-102 General and Analytical 01-101 English Composition I 3 01-102 English Composition Social Science 3 25-122 Trigonometry 23-191 University Seminar I 1 23-192 University Seminar II 23-191 University Seminar I 1 23-192 University Seminar II 23-191 University Seminar I 1 23-194 Intro. to Biology Profest Total Credits 15 To Sophomore Fall Semester Sophomore Spring S Course Course Name Cr Course Name Course Name 23-215 Cell Biology 4 23-210 Genetics 24-301 Organic Chemistry I 4 24-302 Organic Chemistry II 16-100 Fitness and Wellness 2 Literature 23-261 Calculus for Life Sciences 4 23-321 Biostatistics 01-200 Speech 3 23-239 Soph. Semin	Course	Course Name	Cr	Course	Course Name	
24-101 General and Analytical Chem. I 4 24-102 General and Analytical 01-101 English Composition I 3 01-102 English Composition 30-102 English Composition I 3 25-122 Trigonometry 23-191 University Seminar I 1 23-192 University Seminar II 23-191 University Seminar I 1 23-192 University Seminar II 23-191 University Seminar I 1 23-192 University Seminar II 23-191 University Seminar I 1 23-194 Intro. to Biology Profest Total Credits 15 Total Credits 15 Total Credits 15 Total Credits 15 Course Course Name Course Name Course Name 23-210 Genetics 24-301 Organic Chemistry I 4 24-302 Organic Chemistry II 16-100 Fitness and Wellness 2 Literature 23-261 Calculus for Life Sciences 4 23-321 Biostatistics 1 01-200 Speech 3 23-299 Soph. Seminar ? Sci. I 1 23-310 Molecular Biology	23-101	General Biology I	4	23-102	General Biology II	
01-101English Composition I301-102English CompositionSocial Science325-122Trigonometry23-191University Seminar I123-192University Seminar II23-191University Seminar I123-192University Seminar IITotal Credits 15ToSophomore Fall SemesterSophomore Spring SCourse Course NameCrCourse Course Name23-215Cell Biology423-210Genetics24-301Organic Chemistry I424-302Organic Chemistry II16-100Fitness and Wellness2Literature23-261Calculus for Life Sciences423-229Soph. Seminar ? Sci. ITotal Credits 17ToTotal Credits 17ToJunior Spring SerCourse Course NameCr23-310Molecular Biology424-403310Molecular Biology424-40323-310Molecular Biology424-40323-310Molecular Biology426-21223-310Molecular Biology426-212Fundamentals of Physics I426-211Fundamentals of Physics I26-211Fundamentals of Physics I4Course Course NameTotal Credits 15Total Credits 15Total Credits 15Total Credits 15 <td c<="" td=""><td>24-101</td><td>General and Analytical Chem. I</td><td>4</td><td>24-102</td><td>General and Analytical Chem. II</td></td>	<td>24-101</td> <td>General and Analytical Chem. I</td> <td>4</td> <td>24-102</td> <td>General and Analytical Chem. II</td>	24-101	General and Analytical Chem. I	4	24-102	General and Analytical Chem. II
Social Science325-122Trigonometry23-191University Seminar I123-192University Seminar II23-194Intro. to Biology ProfesTotal Credits 15Total Credits 15Sophomore Fall SemesterSophomore Spring SCourse NameCr23-215Cell Biology423-21024-301Organic Chemistry I424-302Organic Chemistry II16-100Fitness and Wellness2Literature23-261Calculus for Life Sciences423-321Biostatistics01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17Total Credits 17 <td< td=""><td>01-101</td><td>English Composition I</td><td>3</td><td>01-102</td><td>English Composition II</td></td<>	01-101	English Composition I	3	01-102	English Composition II	
23-191University Seminar I123-192University Seminar II23-194Intro. to Biology ProfesTotal Credits 15Total Credits 15Sophomore Fall SemesterSophomore Spring SCourse NameCrCourseCourse Name23-215Cell Biology423-210Genetics24-301Organic Chemistry I424-302Organic Chemistry II16-100Fitness and Wellness2Literature23-261Calculus for Life Sciences423-321Biostatistics01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17ToTotal Credits 17Total Credits 17Course NameCourse N		Social Science	3	25-122	Trigonometry	
23-194Intro. to Biology ProfessTotal Credits 15ToSophomore Fall SemesterSophomore Spring SCourse Course NameCrCourse Name23-215Cell Biology423-210Genetics24-301Organic Chemistry I424-302Organic Chemistry II16-100Fitness and Wellness2Literature23-261Calculus for Life Sciences423-321Biostatistics01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17Total Credits 17Course NameCourse NameCourse NameCourse NameSenior Senior Senior	23-191	University Seminar I	1	23-192	University Seminar II	
Total Credits 15ToSophomore Fall SemesterSophomore Spring SCourseCourse NameCrCourseCourse NameCourse23-215Cell Biology423-210Genetics224-301Organic Chemistry I424-302Organic Chemistry II116-100Fitness and Wellness2Literature223-261Calculus for Life Sciences423-321Biostatistics01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17Total Credits 17Course NameCourse NameCourse NameTotal Credits 13Senior Senior Senior Senior Senior Senior Senior Senior Senior Se				23-194	Intro. to Biology Professions	
Total Credits 15ToSophomore Fall SemesterSophomore Spring SCourseCourse NameCrCourseCourse Name23-215Cell Biology423-210Genetics24-301Organic Chemistry I424-302Organic Chemistry II16-100Fitness and Wellness2Literature23-261Calculus for Life Sciences423-321Biostatistics01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17ToTotal Credits 17Total Credits 17Course NameCrCourse Course NameCourse Name<						
Sophomore Fall SemesterSophomore Spring SCourseCourse NameCrCourse Course Name23-215Cell Biology423-210Genetics24-301Organic Chemistry I424-302Organic Chemistry II16-100Fitness and Wellness2Literature23-261Calculus for Life Sciences423-321Biostatistics01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17Total Credits 15Total Credit		Total Credits	15		Total Credits	
CourseCourse NameCrCourseCourse Name23-215Cell Biology423-210Genetics24-301Organic Chemistry I424-302Organic Chemistry II16-100Fitness and Wellness2Literature23-261Calculus for Life Sciences423-321Biostatistics01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17Total Credits 15Total Credits 15Total Credits 15	S	ophomore Fall Semester			Sophomore Spring Semester	
23-215Cell Biology423-210Genetics24-301Organic Chemistry I424-302Organic Chemistry II16-100Fitness and Wellness2Literature23-261Calculus for Life Sciences423-321Biostatistics01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17ToTotal Credits 17Total Credits 17Course Name23-310Molecular Biology423-422Biochemistry OR23-310History331-395Global Societies26-212Fundamentals of Physics 14	Course	Course Name	Cr	Course	Course Name	
24-301Organic Chemistry I424-302Organic Chemistry II16-100Fitness and Wellness2Literature23-261Calculus for Life Sciences423-321Biostatistics01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17Total Credits 17Total Credits 17Junior Fall SemesterJunior Spring SerCourseCourse NameCrCourse Name23-310Molecular Biology424-40323-310Molecular Biology423-422Biochemistry OR23-xxxBiology Elective423-422Biochemical MechanisHistory331-39526-211Fundamentals of Physics I426-212Fundamentals of Physics ITotal Credits 15ToTotal Credits 15ToSummer Research InternshipSenior Fall SemesterSenior Spring SerCourseCourse NameOsign course NameCrCourse NameCrCourse NameSenior Fall SemesterSenior Spring SerCourse NameCrCourse NameSenior Fall SemesterSenior Spring SerCourse NameCrCourse Name<	23-215	Cell Biology	4	23-210	Genetics	
16-100Fitness and Wellness2Literature23-261Calculus for Life Sciences423-321Biostatistics01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17Total Credits 17Total Credits 17Total Credits 17Junior Spring SerCourse Course NameCrCourse NameCrCourse NameCrCourse NameCrCourse Name23-310Molecular Biology423-310Molecular Biology423-310Molecular Biology423-310Molecular Biology423-311Fundamentals of Physics I426-212Fundamentals of Physics IA26-212Fundamentals of Physics IA26-212Fundamentals of Physics IA23-399Junior Seminar-Sci. W23-471Nucleic Acids BiotechrTotal Credits 15Total Credits 15Total Credits 15Total Credits 15Total Credits 15Total Credits 15Senior Spring Seri	24-301	Organic Chemistry I	4	24-302	Organic Chemistry II	
23-261Calculus for Life Sciences423-321Biostatistics01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17Total Credits 17Total Credits 17Total Credits 17Total Credits 17Total Credits 17Total Credits 17Junior Spring SerCourseCourse NameCrCourse Name23-310Molecular Biology424-403Biochemistry OR23-310Molecular Biology423-422Biochemistry OR23-xxxBiology Elective423-422Biochemical MechanisHistory331-395Global Societies26-211Fundamentals of Physics I426-212Fundamentals of Physics I26-211Fundamentals of Physics I426-212Fundamentals of Physics I23-399Junior Seminar-Sci. W23-471Nucleic Acids BiotechrTotal Credits 15ToSenior Fall SemesterSenior Fall SemesterSenior Spring SerCourse NameO3-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B	16-100	Fitness and Wellness	2		Literature	
01-200Speech323-299Soph. Seminar ? Sci. ITotal Credits 17Total Credits 17Junior Fall SemesterJunior Spring SerCourseCourse NameCrCourse Name23-310Molecular Biology424-403Biochemistry OR23-xxxBiology Elective423-422Biochemical MechanisHistory331-395Global Societies26-211Fundamentals of Physics I426-212Fundamentals of Physics26-211Fundamentals of Physics I423-471Nucleic Acids Biotechr23-309Junior Seminar-Sci. W23-471Nucleic Acids BiotechrTotal Credits 15ToSummer Research InternshipSenior Fall SemesterSenior Spring SerCourseCourse Name03-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B	23-261	Calculus for Life Sciences	4	23-321	Biostatistics	
Total Credits 17ToTotal Credits 17ToJunior Fall SemesterJunior Spring SerCourseCourse NameCrCourseCourse Name23-310Molecular Biology424-403Biochemistry OR23-xxxBiology Elective423-422Biochemical MechanisHistory331-395Global Societies26-211Fundamentals of Physics I426-212Fundamentals of Physics I26-211Fundamentals of Physics I426-212Fundamentals of Physics I26-211Fundamentals of Physics I423-471Nucleic Acids Biotechr23-399Junior Seminar-Sci. W23-471Nucleic Acids BiotechrTotal Credits 15ToSummer Research InternshipSenior Fall SemesterSenior Spring SerCourseCourse NameCrCourse Name03-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B	01-200	Speech	3	23-299	Soph. Seminar ? Sci. Literature	
Total Credits 17ToJunior Fall SemesterJunior Spring SerCourseCourse NameCrCourse Course Name23-310Molecular Biology424-403Biochemistry OR23-xxxBiology Elective423-422Biochemical Mechanis23-xxxBiology Elective423-422Biochemical Mechanis23-xxxBiology Elective423-422Biochemical Mechanis23-xxxBiology Elective426-212Fundamentals of Physics26-211Fundamentals of Physics I426-212Fundamentals of Physics26-211Fundamentals of Physics I426-212Fundamentals of Physics26-211Fundamentals of Physics I423-399Junior Seminar-Sci. W23-379Junior Seminar-Sci. W23-471Nucleic Acids BiotechrTotal Credits 15ToSenior Fall SemesterSenior Fall SemesterSenior Spring SerCourse NameOr Summer Research InternshipSenior Fall SemesterSenior Spring SerCourse NameOr Sourse NameCourse NameCourse NameCourse NameArts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B						
Junior Fall SemesterJunior Spring SerCourseCourse NameCrCourse Course Name23-310Molecular Biology424-403Biochemistry OR23-xxxBiology Elective423-422Biochemical MechanisHistory331-395Global Societies26-211Fundamentals of Physics I426-212Fundamentals of Physics26-211Fundamentals of Physics I426-212Fundamentals of Physics26-211Fundamentals of Physics I426-212Fundamentals of Physics23-399Junior Seminar-Sci. W23-399Junior Seminar-Sci. W23-471Nucleic Acids BiotechrTotal Credits 15ToSenior Fall SemesterCourse NameO3-105/ 202/322Ethics course (Humanities)323-472Protein Biotechnology423-410Advanced Molecular B		Total Credits	17		Total Credits	
CourseCourse NameCrCourseCourse Name23-310Molecular Biology424-403Biochemistry OR23-xxxBiology Elective423-422Biochemical Mechanis23-xxxBiology Elective423-422Biochemical Mechanis26-211Fundamentals of Physics I426-212Fundamentals of Physics26-211Fundamentals of Physics I426-212Fundamentals of Physics26-211Fundamentals of Physics I426-212Fundamentals of Physics23-399Junior Seminar-Sci. W23-471Nucleic Acids BiotechrTotal Credits 15Total Credits 15Senior Fall SemesterCourse NameCourseCourse NameCrCourseCourse (Humanities)323-472Protein Biotechnology423-410423-410Advanced Molecular B		Junior Fall Semester		11	Junior Spring Semester	
23-310Molecular Biology424-403Biochemistry OR23-xxxBiology Elective423-422Biochemical MechanisHistory331-395Global Societies26-211Fundamentals of Physics I426-212Fundamentals of Physics I26-211Fundamentals of Physics I426-212Fundamentals of Physics I26-211Fundamentals of Physics I426-212Fundamentals of Physics I23-399Junior Seminar-Sci. W23-471Nucleic Acids BiotechrTotal Credits 15ToSummer Research InternshipCourse NameCrCourseCourse NameCrCourse Name03-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B	Course	Course Name	Cr	Course	Course Name	
23-xxxBiology Elective423-422Biochemical MechanisHistory331-395Global Societies26-211Fundamentals of Physics I426-212Fundamentals of Physics26-211Fundamentals of Physics I426-212Fundamentals of Physics23-399Junior Seminar-Sci. W23-399Junior Seminar-Sci. W23-471Nucleic Acids Biotechr23-471Nucleic Acids BiotechrTotal Credits 15ToSemior Fall SemesterCourse NameCrCourse Senior Spring Ser03-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B	23-310	Molecular Biology	4	24-403	Biochemistry OR	
History331-395Global Societies26-211Fundamentals of Physics I426-212Fundamentals of Phys23-399Junior Seminar-Sci. W23-471Nucleic Acids BiotechrTotal Credits 15Total Credits 15Senior Fall SemesterCourseCourse NameCrCourse Name03-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B	23-xxx	Biology Elective	4	23-422	Biochemical Mechanisms	
26-211Fundamentals of Physics I426-212Fundamentals of Physics I23-399Junior Seminar-Sci. W23-399Junior Seminar-Sci. W23-471Nucleic Acids BiotechrTotal Credits 1523-471Total Credits 15ToSummer Research InternshipSenior Fall SemesterSenior Spring SerCourseCourse NameCrCourse Name03-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B		History	3	31-395	Global Societies	
23-399Junior Seminar-Sci. W23-471Nucleic Acids Biotechr23-471Nucleic Acids BiotechrTotal Credits 15ToSemior Fall SemesterCourse NameCourseCourse NameCrCourse Name03-105/202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B	26-211	Fundamentals of Physics I	4	26-212	Fundamentals of Physics II	
23-471Nucleic Acids BiotechrTotal Credits 15Total Credits 15Summer Research InternshipSenior Fall SemesterSenior Spring SerCourseCourse NameCrCourse NameO3-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B				23-399	Junior Seminar-Sci. Writing*	
Total Credits 15Total Credits 15Summer Research InternshipSenior Fall SemesterSenior Spring SerCourseCourse NameCrCourse Name03-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B				23-471	Nucleic Acids Biotechnology	
Total Credits 15Total Credits 15Summer Research InternshipSenior Fall SemesterSenior Spring SerCourseCourse NameCrCourse Name03-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B						
Summer Research InternshipSenior Fall SemesterSenior Spring SerCourseCourse NameCrCourse Name03-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B		Total Credits	15		Total Credits	
Senior Fall SemesterSenior Spring SeriesCourseCourse NameCrCourse Name03-105/202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B	Summer Resear	ch Internship				
CourseCourse NameCrCourse Name03-105/202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B		Senior Fall Semester			Senior Spring Semester	
03-105/ 202/322Ethics course (Humanities)3Arts and Humanities23-472Protein Biotechnology423-410Advanced Molecular B	Course	Course Name	Cr	Course	Course Name	
23-472 Protein Biotechnology 4 23-410 Advanced Molecular B	03-105/ 202/322	Ethics course (Humanities)	3		Arts and Humanities	
	23-472	Protein Biotechnology	4	23-410	Advanced Molecular Biology	

				Total Credits
	Total Credits	5 13		Total Credits
23-451	Senior Research (Capstone I)**	2	23-499	Senior Seminar (Capstone II)**
23-301	Problems in Biology OR			Open Elective
23-415	Advanced Cell Biology	4	23-xxx	Biology Elective

** Senior Capstone

* Writing Intensive Course(s)

BIOLOGY ELECTIVES: Students must not take less than 18 credits of Biology courses from the course elective list below. These are the only ones that can satisfy the Biology elective requirement for this track. Substitutions can be requested, under special circumstances, but require written approval of advisor and Chair in advance.

The Curriculum Tracks are designed for the intended career goal, including anticipation of entrance examinations, so students should adhere to the suggested sequence. It is advisable for the student to check possible post graduate school requirements during their Junior year to ensure that satisfy expectations of intended graduate/profession choices.

REQUIREMENTS: Students can not take either 23-210 or 23-215 without first passing both 23-101 and 23-102 with a grade of "C" or better. In order for a student to take any 300 or 400 level Biology Department course, they must also pass both 23-210 and 23-215 with a "C" or better. These grade requirements take precedence over, and supersede any lesser specific prerequisites of all 300 or 400 level Biology electives. All students must pass the Biology Comprehensive Assessment (BCA) examination of core courses given to all students in 23-399. If they do not pass, then the student must take 23-498 and pass the BCA, which is required for successful completion of this course, and the biology program.

<u>SPECIAL NOTES</u>: For all programs and tracks, a grade of ?C? or better is required for all Biology courses. For the Cell/Molecular/Biotechnology and for the Health Professions tracks, a grade of ?C? or better is also required in all CMNST courses.

All Biology majors must complete an independent research project. Those who have completed a research project with a biology faculty member (e.g. 23-301 for credit, or via a paid stipend) prior to the beginning of their senior year, and especially if the project was an internship at another institution, the student must present their data to their advisor in order to be exempted from the required Senior Capstone I course. If they have not completed a research project, or their internship is inadequate, then they must register for 23-451or 452 to complete a Capstone research project.

If you take, 23-422 instead of 24-403, then you will need to take another Chemistry course if you want a minor in Chemistry ? Instrumental Analysis (24-306) with lab is suggested. Another set of courses the student can consider is Physics-317 (Foundations of Bioengineering) and Physics 409 (Biosensors and Bio-instrumentation) as electives with advisor, instructor, and Biology Chair approval.

All Biology majors are required to successfully complete Senior Seminar (Capstone II, 23-499), no exceptions.

<u>General Note</u>: The minimum University requirement for graduation is 121 hours; in Biology you will usually complete between 121-125 hours depending on selections.

Biology Electives:	Open Electives:
23-305 Developmental Biology	41-105 Management Processes
23-322 Microbiology	41-325 Organizational Behavior
23-375 Mol. Genetics and Genomics	41-341 Business Ethics
23-420 Immunology	41-435 Entrepreneurship
23-317 Principles of Virology	46-300 Principles of Marketing
23-405 Cell Morphogenesis	35-301 Introduction to Bioinformatics
23-307 Principles of Physiology	25-252 Calculus II
23-370 Human Anatomy	23-411 Pharmacology
	23-311 Neuroscience

Cell/Molecular/Biotechnology

Source URL: http://desu.edu/curriculum-cellmolecularbiotechnology