

This map is not an education "ed" plan. Please make sure to meet with a counselor.

## Math and Science: AS Research & Development

### Academic Program Plan for Full-Time Students

All plans can be modified to fit the needs of part-time students by adding more semesters.

*This sample course sequence does not represent a contract or guarantee of course availability.*

- This plan includes general education satisfying [Plan C](#) (IGETC).
- This plan assumes student placed into transfer-level math and English.
- This plan assumes student successfully completed one year of high school chemistry.
- This plan assumes a fall-semester start.
- This plan assumes student has completed two years of high school coursework in a language other than English with a "C" or better or has equivalent language skills.
- Completion of this plan satisfies the requirements for the **Associate in Science in Research and Development**. The associate degree will be awarded upon completion of at least 60 units of approved coursework, including a minimum of 18 units in a college-defined major, and satisfaction of additional MiraCosta College graduation requirements. Please see [miracosta.edu/degrecertificatetransferinfo/requirements/](http://miracosta.edu/degrecertificatetransferinfo/requirements/).

Year 1: Fall Semester	16-17 Units Total
<b>Biology elective</b> <ul style="list-style-type: none"><li>• Select one of the following: BIO 105 Introductory Biology: Biotechnology in Society or BIO 204/204H Foundations of Biology: Biochemistry, Cell Biology, Genetics, and Molecular Biology*. *BIO 204/204H requires prior completion of CHEM 150/150H.</li><li>• Satisfies the GE Area 5B: Biological Science requirement.</li></ul>	3-4 Units
<b>BTEC 107 Exploring Biotechnology: Emerging Trends, Careers, and the Local Industry</b>	3 Units
<b>GE Area 4: Social &amp; Behavioral Sciences</b>	3 Units
<b>ENGL 100/100H Composition and Reading</b> <ul style="list-style-type: none"><li>• Satisfies the GE Area 1A: English Composition requirement.</li></ul>	4 Units
<b>GE Area 3A: Arts</b> <ul style="list-style-type: none"><li>• All CSU campuses have a graduation requirement of History, Constitution and American Ideals. Students may be certified as completing this requirement by completing a Group I course (HIST 110/110H, HIST 116/116H, HIST 141/141H, HIST 145/145H) AND a Group II course (HIST 111/111H, HIST 117/117H, HIST 142/142H, HIST 146/146H, HIST 165) OR by completing PLSC 102. These courses also</li></ul>	3 Units

partially satisfy GE Area 4.	
<b>Year 1: Spring Semester</b>	<b>16-17 Units Total</b>
<b>BTEC 110/110H Basic Techniques in Biotechnology</b> <ul style="list-style-type: none"> <li>Prior completion of (or concurrent enrollment in) BIO 105, BIO 204/204H, or BTEC 108/108H required.</li> </ul>	5 Units
<b>BTEC 180/180H Biostatistics or MATH 150/150H Calculus and Analytic Geometry I</b> <ul style="list-style-type: none"> <li>MATH 150/150H requires prior completion of MATH 131/131H or eligibility determined by the math placement process.</li> <li>Satisfies the GE Area 2A: Mathematical Concepts &amp; Quantitative Reasoning requirement.</li> </ul>	4-5 Units
<b>BTEC 210 Data Analysis with Excel</b>	1 Units
<b>GE Area 3B: Humanities</b>	3 Units
<b>GE Area 4: Social &amp; Behavioral Sciences</b> <ul style="list-style-type: none"> <li>All CSU campuses have a graduation requirement of History, Constitution and American Ideals. Students may be certified as completing this requirement by completing a Group I course (HIST 110/110H, HIST 116/116H, HIST 141/141H, HIST 145/145H) AND a Group II course (HIST 111/111H, HIST 117/117H, HIST 142/142H, HIST 146/146H, HIST 165) OR by completing PLSC 102. These courses also partially satisfy GE Area 4.</li> </ul>	3 Units
<b>Year 1: Summer Semester</b>	<b>3 Units Total</b>
<b>GE Area 1C: Oral Communication</b> <ul style="list-style-type: none"> <li>Highly recommend completing Area 1C to keep options open for CSU transfer.</li> </ul>	3 Units
<b>Year 2: Fall Semester</b>	<b>13 Units Total</b>
<b>BTEC 120 Business and Regulatory Practices in Biotechnology</b>	3 Units
<b>BTEC elective</b> <ul style="list-style-type: none"> <li>Major electives--Select two courses from the following: BTEC 201 Advanced Cell Culture*, BTEC 203 Techniques in DNA Amplification*, BTEC 204 Recombinant DNA*, BTEC 206 Principles of Separation and HPLC*, BTEC 207 Techniques in Immunochemistry and ELISA*, BTEC 231 Gene Editing Techniques: CRISPR-Cas9*, BTEC 292 Internship Studies, BTEC 299 Occupational Cooperative Work Experience. *Prior completion of BTEC 110/110H required.</li> <li>BTEC 201 typically offered spring semester only. BTEC 203, BTEC 204, BTEC 206, BTEC 207 typically offered fall or spring every third</li> </ul>	1 Units

<b>semester.</b>	
<b>CHEM 150/150H General Chemistry I: For Science Majors</b> <ul style="list-style-type: none"> <li>Requires prior completion of CHEM 140, one year of high school chemistry, or placement exam qualification and MATH 64/64S or eligibility determined by the math placement process.</li> <li>Satisfies the GE Area 5A: Physical Science and 5C: Laboratory Activity requirements.</li> </ul>	5 Units
<b>GE Area 1B: Critical Thinking--English Composition</b>	4 Units
<b>Year 2: Spring Semester</b>	<b>12 Units Total</b>
<b>BTEC elective</b> <ul style="list-style-type: none"> <li>Major electives--Select two courses from the following: BTEC 201 Advanced Cell Culture*, BTEC 203 Techniques in DNA Amplification*, BTEC 204 Recombinant DNA*, BTEC 206 Principles of Separation and HPLC*, BTEC 207 Techniques in Immunochemistry and ELISA*, BTEC 231 Gene Editing Techniques: CRISPR-Cas9*, BTEC 292 Internship Studies, BTEC 299 Occupational Cooperative Work Experience. *Prior completion of BTEC 110/110H required.</li> <li>BTEC 201 typically offered spring semester only. BTEC 203, BTEC 204, BTEC 206, BTEC 207 typically offered fall or spring every third semester.</li> </ul>	1 Units
<b>CHEM 151/151H General Chemistry II: For Science Majors</b> <ul style="list-style-type: none"> <li>Prior completion of CHEM 150/150H required.</li> </ul>	5 Units
<b>GE Area 3A: Arts or 3B: Humanities</b>	3 Units
<b>GE Area 4: Social &amp; Behavioral Sciences</b>	3 Units

Note: All CSU campuses have a graduation requirement of History, Constitution and American Ideals. Students may be certified as completing this requirement by completing one course from Group I and one course from Group II; or by completing the course in Group III.

Group I (select one): HIST 110/110H, 116/116H, 141/141H, or 145/145H

And

Group II (select one): HIST 111/111H, 117/117H, 142/142H, 146/146H, or 165

Or

Group III: PLSC 102