

## Prep Resources:

### Model Degree Plans for Multiple-Subject Certifications in the Sciences and Social Sciences

It's imperative that secondary teacher candidates "know their stuff" in every subject they will be certified to teach.

We developed a set of graphics that illustrates the structure of secondary/high school certifications in each state ([link to Handy Dandy Guide](#)). Two states serve as models to emulate: Tennessee offers only single-subject certifications and licensing tests that ensure teacher candidates know the content of every subject they will be certified to teach; Missouri offers multiple-subject certifications and licensing tests in the sciences and social sciences, but ensures content proficiency in every subject candidates will be certified by requiring passing scores on subject-specific sections of the tests.

Many secondary/high school preparation programs are located in states that, unlike Tennessee and Missouri, do not ensure through the structure of certification and licensing tests that teacher candidates know the content of every subject they will be certified to teach. (In most cases, this is because the candidate will be certified to teach in multiple subjects for which no single licensing test or combination of tests ensures adequate content knowledge. The graphics cited above indicate as much by showing those certifications for which a coursework evaluation at the program level is necessary to ensure adequate content preparation.) Even in the absence of adequate state certification frameworks, teacher preparation programs can ensure adequate preparation, as the examples of institutions below demonstrate.

The examples that follow list the course requirements for each of three types of multiple-subject certification at three different institutions. The requirements are sufficient to provide the content preparation that candidates need to adequately teach the courses to which they can be assigned.

#### Physical Science

A physical science certification generally allows for teaching assignments in all chemistry and physics courses. The science course sequences at **Stephen F. Austin State University** (TX), **McMurry University** (TX) and **Michigan State University** prepare candidates for this broad certification.

#### Stephen F. Austin State University

Degree requirements:

Chemistry	Physics
<ul style="list-style-type: none"> <li>■ CHE 133 – General Chemistry I (4)</li> <li>■ CHE 134 – General Chemistry II (4)</li> <li>■ CHE 231 – Quantitative Analysis (4)</li> <li>■ CHE 241 – Inorganic Chemistry (3)</li> <li>■ CHE 320 – Chemical Concepts (3)</li> <li>■ CHE 321 – Applied Chemical Concepts (3)</li> <li>■ CHE 330 – Fundamentals of Organic Chemistry (4)</li> <li>■ CHE 337 – Physical Chemistry I (4)</li> <li>■ CHE 452 – Comprehensive Biochemistry I (4)</li> </ul>	<ul style="list-style-type: none"> <li>■ PHY 131 – Mechanics and Heat (4)</li> <li>■ PHY 132 – Electricity, Sound and Light (4)</li> <li>■ PHY 250 – Engineering Statics (4)</li> <li>■ PHY 321 – Engineering Dynamics (4)</li> <li>■ PHY 333 – Modern Physics (4)</li> <li>■ PHY 430 – Thermodynamics (3)</li> <li>■ PHY 431 – Introductory Quantum Mechanics (3)</li> <li>■ PHY 440 – Introduction to Electricity and Magnetism (3)</li> </ul>
33 SCH	29 SCH
62 total SCH	

**McMurray University**

Degree requirements:

Chemistry	Physics
<ul style="list-style-type: none"> <li>■ CHE 1410 – General Chemistry I (4)</li> <li>■ CHE 1420 – General Chemistry II (4)</li> <li>■ CHE 2430 – Quantitative Analysis (4)</li> <li>■ CHE 3410 – Organic Chemistry I (4)</li> <li>■ CHE 3420 – Organic Chemistry II (4)</li> <li>■ CHE 3431 – Physical Chemistry I (4)</li> <li>■ Four credits from: CHEM 3432 – Physical Chemistry II CHEM 3441 – Biochemistry I (4)</li> </ul>	<ul style="list-style-type: none"> <li>■ PHYS 2510 – University Physics I (4)</li> <li>■ PHYS 2520 – University Physics II (4)</li> <li>■ PHYS 3270 – Advanced Physics Laboratory (2)</li> <li>■ PHYS 3300 – Introduction to Modern Physics (3)</li> <li>■ PHYS 4300 – Classical Mechanics (3)</li> <li>■ PHYS 4310 – Electricity &amp; Magnetism (3)</li> <li>■ Three credits from and 4000 level PHYS course (3)</li> </ul>
■ Three to four credits from any CHEM or PHYS course (3)	
<b>28+ SCH</b>	<b>24+ SCH</b>
<b>55-56 total SCH</b>	

**Michigan State University**

Degree requirements:

Chemistry	Physics
<ul style="list-style-type: none"> <li>■ Four credits from CEM 141 or CEM 151 (4)</li> <li>■ Three credits from CEM 142 or CEM 152 (3)</li> <li>■ CEM 161 – Chemistry Laboratory I (1)</li> <li>■ CEM 162 – Chemistry Laboratory II (1)</li> <li>■ CEM 251 – Organic Chemistry I (3)</li> <li>■ CEM 252 – Organic Chemistry II (3)</li> <li>■ CEM 255 – Organic Chemistry Laboratory (2)</li> <li>■ CEM 262 – Quantitative Analysis (3)</li> <li>■ CEM 383 – Introductory Physical Chemistry I (3)</li> </ul>	<ul style="list-style-type: none"> <li>■ PHY 183 – Physics for Scientists and Engineers I (4)</li> <li>■ PHY 184 – Physics for Scientists and Engineers II (4)</li> <li>■ PHY 191 – Physics Laboratory for Scientists I (1)</li> <li>■ PHY 192 – Physics Laboratory for Scientists II (1)</li> <li>■ PHY 215 – Thermodynamics and Modern Physics (3)</li> <li>■ PHY 431 – Optics I (3)</li> <li>■ PHY 440 – Electronics (4)</li> </ul>
■ Three credits from any CEM or PHY course (3)	
<b>23+ SCH</b>	<b>20+ SCH</b>
<b>46 total SCH</b>	

## General Science

A general science certification usually allows for teaching assignments in all science courses (biology, chemistry, earth science and physics). The course sequences at **Ohio Dominican University**, **North Dakota State University**, and **Cedarville University** (OH) prepare candidates for this broad certification.

### Ohio Dominican University

Degree requirements:

Biology	Chemistry
<ul style="list-style-type: none"> <li>BIO 201 – Cells, Genetics, Evolution (4)</li> <li>BIO 202 – Botany, Zoology, Ecology (4)</li> <li>BIO 203 – Anatomy and Physiology (4)</li> <li>BIO 330 – Ecology (4)</li> <li>BIO 342 – Human Physiology (4)</li> <li>BIO 366 – Genetics (4)</li> <li>BIO 469 – Cell and Molecular Biology (4)</li> </ul>	<ul style="list-style-type: none"> <li>CHM 109 – General Chemistry I (4)</li> <li>CHM 110 – General Chemistry II (4)</li> <li>CHM 229 – Organic Chemistry I (4)</li> <li>CHM 230 – Organic Chemistry II (4)</li> <li>CHM 359 – Analytical Chemistry (4)</li> <li>CHM 439 – Thermodynamics and Kinetics (4)</li> <li>CHM 440 – Quantum Mechanics and Spectroscopy (4)</li> </ul>
28 SCH	28 SCH
Physics	Earth Sciences
<ul style="list-style-type: none"> <li>PHY 219 – General Physics I (4)</li> <li>PHY 220 – General Physics II (4)</li> </ul>	<ul style="list-style-type: none"> <li>ENV 111 – Astronomy (3)</li> <li>ENV 113 – Geology (3)</li> <li>ENV 115 – Environmental Science (3)</li> </ul>
8 SCH	9 SCH
73 total SCH	

### North Dakota State University

Degree requirements:

Biology	Chemistry
<ul style="list-style-type: none"> <li>BIOL 124 – Environmental Sciences (4)</li> <li>BIOL 150 – General Biology I (4)</li> <li>BIOL 151 – General Biology II (4)</li> <li>BIOL 491 – Senior Seminar (2)</li> <li>BOT 372 – Struct. &amp; Diversity of Plant &amp; Fungi (4)</li> <li>Six credits from BIOL, BOT or ZOO at 300-400 level (6)</li> </ul>	<ul style="list-style-type: none"> <li>CHEM 121 – General Chemistry I (4)</li> <li>CHEM 122 – General Chemistry II (4)</li> <li>CHEM 260 – Elements of Biochemistry (4)</li> <li>CHEM 341 – Organic Chemistry I (4)</li> <li>CHEM 342 – Organic Chemistry II (4)</li> </ul>
24 SCH	20 SCH
Physics	Earth Sciences
<ul style="list-style-type: none"> <li>PHYS 251 – University Physics I (5)</li> <li>PHYS 252 – University Physics II (5)</li> </ul>	<ul style="list-style-type: none"> <li>PHYS 110 – Introductory Astronomy (3)</li> <li>GEOL 105 – Introduction to Physical Geology (4)</li> <li>GEOL 106 – The Earth Through Time (4)</li> </ul>
10 SCH	11 SCH
65 total SCH	

**Cedarville University**

Degree requirements:

Biology	Chemistry
<ul style="list-style-type: none"> <li>BIO 1110 – Introduction to Biology (4)</li> <li>BIO 1120 – General Zoology (4)</li> <li>BIO 2500 – General Botany (4)</li> <li>BIO 2600 – General Ecology (3)</li> <li>BIO 3300 – Genetics (4)</li> <li>BIO 4800 – Senior Seminar - Biology (1)</li> <li>Three credit biology elective (3)</li> </ul>	<ul style="list-style-type: none"> <li>CHEM 1110 – General Chemistry I (4)</li> <li>CHEM 1120 – General Chemistry II (4)</li> <li>CHEM 2800 – Introduction to Research in Chemistry (1)</li> <li>CHEM 3510 – Organic Chemistry I (4)</li> <li>CHEM 3710 – Biochemistry (4)</li> <li>Three credit chemistry elective (3)</li> </ul>
<b>23 SCH</b>	<b>20 SCH</b>
Physics	Earth Sciences
<ul style="list-style-type: none"> <li>PHYS 1010 – College Physics I (5)</li> <li>PHYS 1020 – College Physics II (5)</li> </ul>	<ul style="list-style-type: none"> <li>ESCI 2510 – Introductory Astronomy (4)</li> <li>GEOL 1110 – Introduction to Physical Geology (4)</li> <li>Four credit earth science elective (4)</li> </ul>
<b>10 SCH</b>	<b>12 SCH</b>
<b>65 total SCH</b>	

**General Social Science**

A general social science certification usually allows for teaching assignments in all social science courses (history, political science, economics, psychology, geography). The course sequences at **West Texas A&M University**, **Urbana University** (OH), and **Drexel University** (PA) prepare candidates for this broad certification.

**West Texas A&M University**

Degree requirements:

History	Political Science
<ul style="list-style-type: none"> <li>HIST 2311 – Western Civilization (3)</li> <li>HIST 3301 – Historical Methods (3)</li> <li>HIST 2301 – Texas History Survey (3)</li> <li>Three credits from HIST 1301, 1302 or 2381 (3)</li> <li>Six credits from HIST 2315, 2321, 2323, 2370, 2371 or 2372 (6)</li> <li>Six credits from HIST 3000-4000 level (6)</li> </ul>	<ul style="list-style-type: none"> <li>POSC 2304 – Introduction to Political Science (3)</li> <li>POSC 2305 – American Government (3)</li> <li>POSC 2306 – American State &amp; Local Government (3)</li> <li>POSC 4333 or 4335 (3)</li> <li>Three credits from POSC 3365, 4366, 4367 or 4368 (3)</li> <li>Three credits from POSC 3301, 3303, 3305, 3312, 3318 or 4381 (3)</li> <li>Three credits from POSC 3311, 3313, 3315, 3317, 4370 or 4371 (3)</li> <li>Three credits from POSC elective not previously selected (3)</li> </ul>
<b>24 SCH</b>	<b>24 SCH</b>
Economics	Geography
<ul style="list-style-type: none"> <li>ECON 2301 – Principles of Macroeconomics (3)</li> <li>ECON 2302 – Principles of Microeconomics (3)</li> <li>Three credits from ECON at the 3000-4000 level (3)</li> </ul>	<ul style="list-style-type: none"> <li>GEOG 1320 or 3308</li> </ul>
<b>9 SCH</b>	<b>3 SCH</b>
Psychology	
<ul style="list-style-type: none"> <li>Three credits from PSYC at any level (3)</li> </ul>	
<b>3 SCH</b>	
<b>63 total SCH</b>	

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### Urbana University

Degree requirements:

History	Political Science
<ul style="list-style-type: none"> <li>■ HST 201 – United States History I: 1492-1865 (3)</li> <li>■ HST 202 – United States History II: 1866-1975 (3)</li> <li>■ HST 203 – United States History III: 1976 to Present (3)</li> <li>■ HST 205 – Ohio History (3)</li> <li>■ HST 221 – World Civilization I (3)</li> <li>■ HST 222 – World Civilization II (3)</li> <li>■ HST 341 – United States Social &amp; Cultural History (3)</li> <li>■ Three credits from HST 301, 350 or 351 (3)</li> <li>■ Six credits from HST 301, 312, 314, 325 or 412 (6)</li> </ul>	<ul style="list-style-type: none"> <li>■ POS 200 – Principles of Political Science (3)</li> <li>■ POS 204 – American Government (3)</li> <li>■ POS 206 – State and Local Government (3)</li> <li>■ POS 410 – Social Identity Seminar (3)</li> <li>■ Three credits from POS 300, 302 or 323 (3)</li> <li>■ Three credits from POS 305, 405 or 408 (3)</li> </ul>
<b>30 SCH</b>	<b>18 SCH</b>
Economics	Psychology
<ul style="list-style-type: none"> <li>■ ECO 201 – Principles of Economics: Macro (3)</li> <li>■ ECO 202 – Principles of Economics: Micro (3)</li> <li>■ ECO 301 – Economics of Innovation and Entrepreneurship (3)</li> </ul>	<ul style="list-style-type: none"> <li>■ PSY 200 – General Psychology (3)</li> <li>■ PSY 202 – Social Psychology (3)</li> </ul>
<b>9 SCH</b>	<b>6 SCH</b>
<b>Geography</b>	
<ul style="list-style-type: none"> <li>■ GEOG 201 – Principles of Geography (3)</li> </ul>	
<b>3 SCH</b>	
<b>66 total SCH</b>	

### Drexel University\*

Degree requirements:

History	Political Science
<ul style="list-style-type: none"> <li>■ HIST 161 – Themes in World Civilization I (2)</li> <li>■ HIST 162 – Themes in World Civilization II (2)</li> <li>■ HIST 163 – Themes in World Civilization III (2)</li> <li>■ HIST 201 – United States History to 1815 (2)</li> <li>■ HIST 202 – United States History 1815-1900 (2)</li> <li>■ HIST 203 – United States History since 1900 (2)</li> <li>■ HIST 212 – Themes in African-American History (2)</li> <li>■ HIST 216 – Freedom in America (2)</li> <li>■ HIST 222 – History of Work &amp; Workers in America (2)</li> <li>■ HIST 224 – Women in American History (2)</li> <li>■ HIST 276 – The History of Philadelphia (2)</li> <li>■ HIST 285 – Technology in Historical Perspective (2)</li> </ul>	<ul style="list-style-type: none"> <li>■ PSCI 110 – American Government I (2.7)</li> <li>■ PSCI 140 – Introduction to Comparative Political Analysis (2.7)</li> <li>■ PSCI 150 – International Politics (2.7)</li> <li>■ PSCI 220 – Constitutional Law I (2.7)</li> <li>■ PSCI 240 – Comparative Government I (2.7)</li> <li>■ PSCI 329 – Theories of Justice (2)</li> <li>■ PSCI 375 – Politics of Immigration (2)</li> </ul>
<b>24 SCH</b>	<b>17.5 SCH</b>
Economics	Psychology
<ul style="list-style-type: none"> <li>■ ECON 201 – Principles of Microeconomics (2.7)</li> <li>■ ECON 202 – Principles of Macroeconomics (2.7)</li> </ul>	<ul style="list-style-type: none"> <li>■ PSY 101 – General Psychology I (2)</li> <li>■ PSY 150 – Introduction to Social Psychology (2)</li> </ul>
<b>5.4 SCH</b>	<b>4 SCH</b>
<b>50.9 total SCH</b>	

\* Drexel operates on academic quarters, which are converted into semester credit hours for continuity (3 quarters credits = 2 semester credits)