

# WATER RESOURCES MANAGEMENT, DOCTORAL MINOR

## REQUIREMENTS

### REQUIREMENTS REQUIRED COURSES

Students select courses in consultation with their doctoral minor advisor and departmental advisor. Students must earn a B or better in courses used to satisfy doctoral minor requirements. Minor and major requirements cannot overlap or double-count.

| Code   | Title   | Credits   |
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| Students must complete the following courses.  |   |           |
| CIV ENGR/<br>ENVIR ST/<br>URB R PL 718   | Water Resources Management<br>Practicum Planning Seminar II | 2         |
| CIV ENGR/<br>ENVIR ST/<br>URB R PL 719   | Water Resources Management<br>Summer Practicum              | 4         |
| <b>Breadth</b>   |   | <b>5</b>  |
| Students must complete two courses numbered 300 or above from the categories below. The course lists below are not meant to be all-inclusive, and students are not restricted to the courses listed here. This is a sample of appropriate courses for these categories that are offered through various departments/programs. Breadth courses should complement the doctoral major and academic background as well as address any gaps in training within the curriculum breadth categories. |   |           |
| <b>Total Credits</b>   |   | <b>11</b> |

#### Category A: Natural Science & Technology courses

| Code  | Title                                   | Credits |
|---|---|---------|
| AGROECOL/<br>AGRONOMY/<br>ENVIR ST 724                          | Agroecosystems and Global Change        | 3       |
| AGRONOMY/<br>ATM OCN/<br>SOIL SCI 532                           | Environmental Biophysics                | 3       |
| AGRONOMY/<br>ENTOM/F&W ECOL/<br>M&ENVTOX 632                    | Ecotoxicology: The Chemical Players     | 1       |
| ATM OCN/BOTANY/<br>CIV ENGR/<br>ENVIR ST/GEOSCI/<br>ZOOLOGY 911 | Limnology and Marine Science<br>Seminar | 1       |
| BOTANY 330  | Algae                                   | 3       |
| BOTANY/ENVIR ST/<br>F&W ECOL/<br>ZOOLOGY 651                    | Conservation Biology                    | 3       |

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| BOTANY/<br>F&W ECOL 402                | Dendrology: Woody Plant<br>Identification and Ecology          | 3   |
| BOTANY/GEOG 338                        | Environmental Biogeography                                     | 3   |
| BOTANY/<br>ZOOLOGY 725                 | Ecosystem Concepts   | 3   |
| BSE 571                                | Small Watershed Engineering                                    | 3   |
| BSE/CIV ENGR/<br>SOIL SCI 372          | On-Site Waste Water Treatment and<br>Dispersal                 | 2   |
| BSE/ENVIR ST 367                       | Renewable Energy Systems                                       | 3   |
| CIV ENGR 310                           | Fluid Mechanics  | 3   |
| CIV ENGR 311                           | Hydroscience   | 3   |
| CIV ENGR 320                           | Environmental Engineering                                      | 3   |
| CIV ENGR 415                           | Hydrology  | 3   |
| CIV ENGR 500                           | Water Chemistry  | 3   |
| CIV ENGR 618                           | Special Topics in Hydraulics and<br>Fluid Mechanics            | 1-3 |
| CIV ENGR 619                           | Special Topics in Hydrology                                    | 1-3 |
| CIV ENGR/<br>ENVIR ST/<br>URB R PL 717 | Water Resources Management<br>Practicum Planning Seminar I     | 1   |
| ENVIR ST 901                           | Graduate Orientation Seminar                                   | 1   |
| ENVIR ST/<br>F&W ECOL/<br>ZOOLOGY 360  | Extinction of Species  | 3   |
| ENVIR ST/<br>GEOG 339                  | Environmental Conservation                                     | 4   |
| ENVIR ST/<br>GEOSCI 411                | Energy Resources   | 3   |
| ENVIR ST/<br>LAND ARC 361              | Wetlands Ecology   | 3   |
| ENVIR ST/<br>POP HLTH 471              | Introduction to Environmental<br>Health                        | 3   |
| ENVIR ST/<br>SOIL SCI 324              | Soils and Environmental Quality                                | 3   |
| ENVIR ST/<br>SOIL SCI 575              | Assessment of Environmental<br>Impact                          | 3   |
| ENVIR ST/<br>ZOOLOGY 315               | Limnology-Conservation of Aquatic<br>Resources                 | 2   |
| ENVIR ST/<br>ZOOLOGY 510               | Ecology of Fishes  | 3   |
| ENVIR ST/<br>ZOOLOGY 511               | Ecology of Fishes Lab  | 2   |
| GEOG 342                               | Geography of Wisconsin   | 3   |
| GEOG/GEOSCI 420                        | Glacial and Pleistocene Geology                                | 3   |
| GEOSCI 875                             | Advanced Topics in Geology                                     | 1-3 |
| GEOSCI/G L E 627                       | Hydrogeology   | 3-4 |
| LAND ARC 668                           | Restoration Ecology  | 3   |
| SOIL SCI 301                           | General Soil Science   | 3   |
| SOIL SCI 321                           | Soils and Environmental Chemistry                              | 3   |
| ZOOLOGY 316                            | Laboratory for Limnology-<br>Conservation of Aquatic Resources | 2-3 |
| ZOOLOGY 955                            | Seminar-Limnology  | 1   |

**Category B: Water Resources Institutions & Public Decision-Making Processes courses**

| Code   | Title   | Credits |
|--|---|---------|
| A A E/ECON/<br>ENVIR ST 343                  | Environmental Economics                                       | 3-4     |
| A A E/ECON/<br>ENVIR ST/<br>URB R PL 671     | Energy Economics  | 3       |
| A A E/ECON/<br>F&W ECOL 531                  | Natural Resource Economics                                    | 3       |
| A A E/ENVIR ST/<br>POP HLTH/<br>PUB AFFR 881 | Benefit-Cost Analysis   | 3       |
| ANTHRO 477                                   | Anthropology, Environment, and Development                    | 3       |
| C&E SOC 375                                  | Special Topics  | 1-4     |
| C&E SOC/CURRIC/<br>ENVIR ST 405              | Education for Sustainable Communities                         | 3       |
| C&E SOC/SOC 541                              | Environmental Stewardship and Social Justice                  | 3       |
| C&E SOC/SOC/<br>URB R PL 617                 | Community Development   | 3       |
| CIV ENGR/<br>ENVIR ST/<br>URB R PL 717       | Water Resources Management Practicum Planning Seminar I       | 1       |
| CSCS 460                                     | Civil Society and Community Leadership                        | 3       |
| ECON/ENVIR ST/<br>POLI SCI/<br>URB R PL 449  | Government and Natural Resources                              | 3-4     |
| ENGL/<br>ENVIR ST 305                        | Rhetoric, Science, and Public Engagement                      | 3       |
| ENVIR ST 349                                 | Climate Change Governance                                     | 3       |
| ENVIR ST 402                                 | Special Topics: Social Perspectives in Environmental Studies  | 1-4     |
| ENVIR ST 901                                 | Graduate Orientation Seminar                                  | 1       |
| ENVIR ST/<br>F&W ECOL 515                    | Natural Resources Policy                                      | 3       |
| ENVIR ST/<br>GEOG 337                        | Nature, Power and Society                                     | 3       |
| ENVIR ST/<br>GEOG 339                        | Environmental Conservation                                    | 4       |
| ENVIR ST/<br>GEOG 439                        | US Environmental Policy and Regulation                        | 3-4     |
| ENVIR ST/HISTORY/<br>LEGAL ST 430            | Law and Environment: Historical and Contemporary Perspectives | 3       |
| ENVIR ST/JOURN/<br>LSC 823                   | Science and Environment Communication                         | 3       |
| ENVIR ST/<br>PHILOS 441                      | Environmental Ethics  | 3-4     |
| ENVIR ST/POLI SCI/<br>PUB AFFR 866           | Global Environmental Governance                               | 3       |
| ENVIR ST/<br>SOIL SCI 575                    | Assessment of Environmental Impact                            | 3       |
| ENVIR ST/<br>URB R PL 843                    | Land Use Policy and Planning                                  | 3       |

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| ENVIR ST/<br>URB R PL 865              | Water Resources Institutions and Policies                    | 3   |
| ENVIR ST/<br>URB R PL 917              | Public Participation for Planning and Policy Making          | 3   |
| GEOG 340                               | World Regions in Global Context                              | 3   |
| GEOG/<br>HISTORY 932                   | Seminar in American Environmental History                    | 3   |
| ISY E/M H R 729                        | Behavioral Analysis of Management Decision Making            | 3   |
| INTER-HE 801                           | Special Topics in Human Ecology                              | 1-3 |
| JOURN 566                              | Communication and Public Opinion                             | 4   |
| LAW 845                                | Water Rights Law   | 2-3 |
| LAW 848                                | Introduction to Environmental Law                            | 3   |
| LAW/URB R PL 830                       | Land Use Controls  | 3   |
| LSC 560                                | Scientific Writing   | 3   |
| POLI SCI/<br>PUB AFFR 871              | Public Program Evaluation                                    | 3   |
| POLI SCI/<br>PUB AFFR/<br>URB R PL 874 | Policy-Making Process  | 3   |
| POLI SCI/<br>PUB AFFR/<br>URB R PL 878 | Public Management  | 3   |
| PUB AFFR 974                           | Topics in Public Affairs                                     | 3   |
| URB R PL 590                           | Contemporary Topics in Urban and Regional Planning           | 1-3 |
| URB R PL 601                           | Site Planning  | 3   |
| URB R PL 731                           | Introduction to Regional Planning                            | 3   |
| URB R PL 741                           | Introduction to Planning                                     | 3   |
| URB R PL 841                           | Urban Functions, Spatial Organization and Environmental Form | 2-3 |

**Category C: Analytical & Design Tools in Water Resources courses**

| Code   | Title   | Credits |
|--|---|---------|
| A A E/ENVIR ST/<br>POP HLTH/<br>PUB AFFR 881 | Benefit-Cost Analysis                             | 3       |
| BSE 571                                      | Small Watershed Engineering                       | 3       |
| CIV ENGR 310                                 | Fluid Mechanics                                   | 3       |
| CIV ENGR 415                                 | Hydrology   | 3       |
| CIV ENGR 416                                 | Water Resources Systems Analysis                  | 3       |
| CIV ENGR 515                                 | Hydroclimatology for Water Resources Management   | 3       |
| CIV ENGR/<br>ENVIR ST/<br>GEOG 377           | An Introduction to Geographic Information Systems | 4       |
| CIV ENGR 516                                 | Hydrologic Data Analysis                          | 3       |
| CIV ENGR/<br>ENVIR ST/<br>LAND ARC 556       | Remote Sensing Digital Image Processing           | 3       |
| ECON/PUB AFFR/<br>URB R PL 734               | Regional Economic Problem Analysis                | 3       |

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| ENVIR ST/<br>F&W ECOL/G L E/<br>GEOG/GEOSCI/<br>LAND ARC 371 | Introduction to Environmental<br>Remote Sensing                           | 3   |
| ENVIR ST/GEOG/<br>LAND ARC/<br>URB R PL 532                  | Applications of Geographic<br>Information Systems in Planning             | 3   |
| ENVIR ST/<br>LAND ARC/<br>SOIL SCI 695                       | Applications of Geographic<br>Information Systems in Natural<br>Resources | 3   |
| ENVIR ST/<br>SOIL SCI 575                                    | Assessment of Environmental<br>Impact                                     | 3   |
| F&W ECOL/HORT/<br>STAT 571                                   | Statistical Methods for Bioscience I                                      | 4   |
| F&W ECOL/HORT/<br>STAT 572                                   | Statistical Methods for Bioscience II                                     | 4   |
| GEOG 378   | Introduction to Geocomputing  | 4   |
| GEOG 500   | Qualitative Strategies in Geography                                       | 3   |
| GEOG 579   | GIS and Spatial Analysis  | 4   |
| GEOG 970   | Seminar in Geographic Information<br>Science                              | 1-3 |
| GEOSCI/G L E 627   | Hydrogeology  | 3-4 |
| GEOSCI/G L E 724   | Groundwater Flow Modeling   | 3   |
| M H R 728  | Bargaining, Negotiating and Dispute<br>Settlement for Managers            | 3   |
| PUB AFFR 818   | Introduction to Statistical Methods<br>for Public Policy Analysis         | 3   |
| PUB AFFR 819   | Advanced Statistical Methods for<br>Public Policy Analysis                | 3   |
| REAL EST/<br>URB R PL 720                                    | Urban Economics   | 3   |
| SOC WORK/<br>URB R PL 721                                    | Methods of Planning Analysis  | 3   |
| STAT 301   | Introduction to Statistical Methods                                       | 3   |
| URB R PL 841   | Urban Functions, Spatial<br>Organization and Environmental<br>Form        | 2-3 |