

# Water Resources

## Department Information

- **Department Web Site:**  
[www.ndsu.edu/aben/](http://www.ndsu.edu/aben/) (<http://www.ndsu.edu/aben/>)
- **Credential Offered:**  
UG Certificate
- **Program Overview:**  
[catalog.ndsu.edu/programs-study/undergraduate/water-resources/](http://catalog.ndsu.edu/programs-study/undergraduate/water-resources/) (<http://catalog.ndsu.edu/programs-study/undergraduate/water-resources/>)

## Certificate Requirements

### Certificate: Water Resources

Required Credits: 12

| Code                                                                                                          | Title                                            | Credits |
|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------|---------|
| Select one course from each category and one additional course from any category for a minimum of 12 credits. |                                                  |         |
| <b>Hydrology</b>                                                                                              |                                                  |         |
| Select one course from the following for hydrology:                                                           |                                                  | 3       |
| ABEN 464                                                                                                      | Resource Conservation and Irrigation Engineering |         |
| ABEN 484                                                                                                      | Drainage and Wetland Engineering                 |         |
| CE 421                                                                                                        | Open Channel Flow                                |         |
| CE 474                                                                                                        | Groundwater Sustainability Design                |         |
| CE 477                                                                                                        | Applied Hydrology                                |         |
| GEOL 414                                                                                                      | Hydrogeology                                     |         |
| NRM 402                                                                                                       | River and Stream Resource Management             |         |
| NRM 454                                                                                                       | Wetland Resources Management                     |         |
| or SOIL 454                                                                                                   | Wetland Resources Management                     |         |
| or RNG 454                                                                                                    | Wetland Resources Management                     |         |
| NRM 453                                                                                                       | Rangeland Resources Watershed Management         |         |
| or RNG 453                                                                                                    | Rangeland Resources Watershed Management         |         |
| <b>Soil and Water Quality</b>                                                                                 |                                                  |         |
| Select one course from the following for Soil and Water Quality:                                              |                                                  | 3       |
| CE 408                                                                                                        | Water Resources and Supply                       |         |
| CE 478                                                                                                        | Water Quality Management                         |         |
| ENVE 460                                                                                                      | Environmental Fate and Transport                 |         |
| GEOL 410                                                                                                      | Sedimentology/Stratigraphy                       |         |
| GEOL 412                                                                                                      | Geomorphology                                    |         |
| or GEOG 412                                                                                                   | Geomorphology                                    |         |
| GEOL 428                                                                                                      | Geochemistry                                     |         |
| SOIL 410                                                                                                      | Soils and Land Use                               |         |
| SOIL 433                                                                                                      | Soil Ecohydrology and Physics                    |         |
| SOIL 444                                                                                                      | Soil Genesis and Survey                          |         |
| <b>Technology</b>                                                                                             |                                                  |         |
| Select one course from the following for Technology:                                                          |                                                  | 3       |
| ABEN 482                                                                                                      | Instrumentation & Measurements                   |         |
| GEOL 465                                                                                                      | Remote Sensing of the Environment                |         |
| or GEOG 465                                                                                                   | Remote Sensing of the Environment                |         |
| CE 476                                                                                                        | Watershed Modeling                               |         |
| GEOL 470                                                                                                      | Remote Sensing                                   |         |
| or GEOG 470                                                                                                   | Remote Sensing                                   |         |
| GEOG 455                                                                                                      | Introduction to Geographic Information Systems   |         |

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|--------------------------------------------|--------------------------------------------------------------|-----------|
| GEOG 456                                   | Advanced Geographic Information Systems                      |           |
| GEOG 480                                   | Geographic Information Systems Pattern Analysis and Modeling |           |
| SOIL 447                                   | Microclimatology                                             |           |
| <b>Additional Course</b>                   |                                                              |           |
| Select one course from any category above. |                                                              | 3         |
| <b>Total Credits</b>                       |                                                              | <b>12</b> |