Portland State University
Graduate Certificate in Hydrology
(Effective Catalog Year: Fall, 2017)

The Graduate Certificate of Hydrology is designed to give students advanced training in hydrology, and leads to professional certification with the American Institute of Hydrology (AIH).

Trained hydrologic professionals are necessary to solve problems concerning drinking water supplies, stream habitat and water supply requirements for important aquatic organisms, the variability of climate and its effect on water supplies and hazards, and the threat posed to all these resources by industrial, agricultural and domestic contamination and overuse.

Employment possibilities include federal, state and local governmental agencies; commercial and industrial corporations in the private sector; and private consulting firms knowledgeable in hydrogeologic regulations, wetland mitigations, environmental regulations, flood prediction, pollution abatement and bioremediation, environmental site audits, and regulatory compliance.

This Certificate program enhances professional development and can put students in a better position either to pursue a graduate degree and/or to pursue certification as a professional hydrologist with the AIH. A student earning a Graduate Certificate in Hydrology achieves a significant proportion of educational requirements and satisfies all primary hydrology coursework for qualification as a member of the AIH.

Program Goals

The goals of this Certificate program are:

- A conceptual foundation surface hydrology, hydrogeology and water quality.
- Competence in solving quantitative and qualitative hydrologic problems.
- Completion of primary hydrological education requirements for certification as a Professional Hydrologist with AIH.

Admission Requirements

All PSU Graduate Certificate programs require admission by the University. Applicants must have a bachelor's degree from an accredited institution and a cumulative GPA of at least 2.75 in all undergraduate courses. Applicants with cumulative undergraduate GPAs between 2.50 and 2.74 may be considered for conditional admission only.

Department admission requirements for this Graduate Certificate include 8 undergraduate credits each in physics, chemistry and calculus. Applicants may be considered for a conditional admission. No prior coursework in hydrology is necessary for admission.

Certificate Requirements

Course requirements for this Certificate include successful completion of one of three surface hydrology core courses (4 credits total); one of two hydrogeology core courses (4 credits total); one of three water quality core courses (4 credits total); an additional Category I course (4 credits total); and two Category II courses (8 credits total), for 24 total credits (6 total courses).

Currently this certificate cannot be completed fully online.

Surface Hydrology Core Courses: (Select one course)
CE 564 Hydrologic and Hydraulic Modeling: 4 credits
CE 565 Watershed Hydrology: 4 credits
ESM 525 Watershed Hydrology: 4 credits
GEOG 514 Hydrology: 4 credits
G 566 Glaciology: 4 credits
Hydrogeology Core Courses: (Select one course)
CE 569 Subsurface Hydrology: 4 credits
ESM 579 Fate and Transport of Toxics in the Environment
G 543 Ground Water Geology: 4 credits
G 545 Geochemistry: 4 credits
Water Quality Core Course: (Select one course)
ESM 527 Watershed Biogeochemistry
ESM 575 Limnology: 4 credits
ESM 579 Fate and Transport of Toxics in the Environment
CE 578 Water Quality Modeling: 4 credits
G 545 Geochemistry: 4 credits
G 548 Chemical Hydrogeology: 4 credits

Category I courses: (Select one course)
*Note that any Core Course can be used as a Category I course.
Hydrology and hydrogeology specialty area:
CE 561 Water Resources Systems Analysis: 4 credits
CE 567 Hydrologic and Hydraulic Design: 4 credits
CE 570 Groundwater Modeling: 4 credits
CE 572 Environmental Fluid Mechanical Transport: 4 credits
CE 576 Environmental Fluid Mechanics II: 4 credits
CE 581 The Columbia River as a System: 4 credits
CE 590 Soil and Groundwater Restoration: 4 credits
GEOG 547 Urban Streams: 4 credits
GEOG 594 GIS for Water Resources: 4 credits
G 544 Well Dynamics: 4 credits
PH 626 Hydrodynamics: 4 credits
Water Quality Specialty Area:
ESM 575 Limnology: 4 credits
ESM 577 Limnology Laboratory: 2 credits
CE 578 Water Quality Modeling: 4 credits
CE 587 Aquatic Chemistry: 4 credits
ESM 520 Ecological Toxicology: 4 credits
ESM 524 Wetland Ecology: 4 credits
ESM 526 Ecology of Streams and Rivers: 4 credits

Category II courses: (Select two courses)
Hydrology and Hydrogeology specialty areas:
CE 582 Introduction to Sediment Transport: 4 credits
CE 583 Estuarine Circulation: 4 credits
ESM 562 Climate Change Impacts, Adaptations and Responses: 4 credits
ESM 571 Atmospheric Physics: 4 credits
GEOG 512 Global Climate Change Science and Socio-environmental Impact Assessment: 4 credits
GEOG 515 Soils and Land Use: 4 credits
GEOG 546 Water Resource Management: 4 credits
G 520 Applied Geophysics: 4 credits
G 547 Sedimentology: 4 credits
G 561 Environmental Geology: 4 credits
G 570 Engineering Geology: 4 credits
Water Quality specialty areas:
BI 523 Microbial Ecology: 4 credits
ESM 563 Water Quality Policy & Management: 4 credits
ESM 573 Phytoplankton Ecology: 4 credits
ESM 580 Coastal Marine Ecology: 4 credits
ESM 583 Marine Conservation and Management: 4 credits
CE 574 Unit Operations of Environmental Engineering: 4 credits
General Skills areas applicable to hydrology:
CE 566 Environmental Data Analysis: 4 credits
CE 573 Numerical Methods in Environmental and Water Res Engineering: 4 credits
ESM 566 Environmental Data Analysis: 4 credit
ESM 567 Multivariate Analysis of Environmental Data: 4 credits
GEOG 580 Remote Sensing and Image Analysis: 4 credits
GEOG 581 Digital Image Analysis I: Introduction
GEOG 588 Geographic Information Systems I: Introduction: 4 credits
GEOG 593 Digital Terrain Analysis: 4 credits
GEOG 597 Spatial Quantitative Analysis: 4 credits
G 523 Statistics and Data Analysis in the Geosciences: 4 credits
G 524 Geographical Information Systems for Natural Science: 4 credits

For course descriptions, please see the PSU bulletin.
Courses must be completed within seven years of the award of Graduate Certificate, and a cumulative GPA of 3.000 must be attained in all courses to be used for the Certificate. At least two thirds of the credits for the Graduate Certificate or 15 credits, whichever is larger, are required to be taken at Portland State University.