**BGC TABLE (10-9-2019). LIST OF COURSES ELIGIBLE TO COUNT TOWARD 15-CREDIT REQUIREMENT FOR BIOGEOCHEMISTRY DUAL-TITLE PHD DEGREE**

**(COURSES NOT ON THIS LIST CAN BE APPROVED BY PROGRAM HEAD WHEN JUSTIFICATION IS PROVIDED )**

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| **A** | **B** | **C** | **D** | **E** | **F** |
| **Biogeochemistry** | **Biochemistry and Microbiology** | **Soil Science and Materials Science and Engineering** | **Water Reactions & Transport** | **Plant-Microbe Interactions and Plant Systems** | **Research Tools** |
| **A 2-credit Topics in Biogeochemistry course (cross-listed as GEOSC 536, SOILS 536, or CE 536) is offered every other fall semester and counts as 2 credits in any of the six categories** |
| Organic GeochemistryGEOSC 419 3 credits | Geomicrobiology GEOSC 409W3 credits | Soil Properties and Functions SOILS 502 3 credits | Geochemistry of Aqueous Systems, GEOSC 5223 credits | Soil EcologySOILS 412W3 credits | Introduction to IsotopesGEOSC 4163 credits |
| Mathematical Modeling in Geosciences, GEOSC 5614 credits | Environmental Soil Microbiology SOILS 512 3 credits | Surface Chemistry, CHEM 448, or Surface Characterization (CHE/MATSE 597A) 3 credits | Principles of GeochemistryGEOSC 533 3 credits | Environmental Biophysics ERM 4443 credits | Techniques in Environ. GeochemistryGEOSC 413 3 credits |
| Marine BiogeochemistryGEOSC 4113 credits | Biological ChemistryCHEM 476 3 credits | Nature of Soil Minerals SOILS 5193 credits | GEOSC 452 Hydrogeology 3 credits | Ecology of Plant Roots HORT 5173 credits | Isotope Course Series, each 2 credits, GEOSC 518A, 518B, 518C, 518D |
| Evolution of the Biosphere GEOSC 5024 credits | Environmental Microbiology for Engineers, C E 4793 credits | Soil Genesis and Classification SOILS 416 3 credits | HydropedologySOILS 4053 credits | Plant NutritionHORT 402W3 credits | Analytical Separations, CHEM 525 3 credits |
| Kinetics of Geochemical Processes, GEOSC 560 3 credits | General BiochemistryBMB 401 or 4023 credits | Remediation of Contaminated Soils SOILS 420 3 credits | Watershed Hydrology and Management, FOR 4703 credits  | Techniques and Concepts in Plant EcophysiologyHORT 514 2 credits | Spectroscopic Analysis CHEM 5263 credits |
| Ecosystem Nutrient Cycles SOILS 5713 credits | Lab in Molecular Genetics BMB 445W 3 credits | Soil GenesisSOILS 5161 credit | Unsaturated Zone Hydrology & Chemical Transport SOILS 504 3 cred  | Microbe-Plant InteractionsPPEM 4053 credits | Molecular Spectroscopy CHEM 5673 credits |
| Biophysical ChemistryCHEM 5403 credits | Microbial Physiology and StructureMICRB 401 3 credits | Soil Environmental Chemistry SOILS 5133 credits | Water Quality Chemistry C E 4753 credits | Fundamentals of Plant Pathology PPATH 5053 credits | Spectroscopic Methods in Bioinorganic Chemistry CHEM 538 3 credits |
| Physical Chemistry-Thermodynamics CHEM 450 3 credits | Microbial DiversityMICRB 4132 credits | Urban SoilsSOILS 404 3 credits | Groundwater Hydrology: Analysis and ModelingC E 555 3 credits | PhytobacteriologyPPEM 4173 credits | Computational Chemistry CHEM 408 3 credits |
| Critical Zone Science Seminar, GEOSC 589, 2 credits | Biomolecular Structure BMMB 5312 credits | Soil Morphology Practicum SOILS 4032 credits | Reactive Transport Processes in Natural Systems (Porous Media) C E 574 3 credits | Plant Virology: Molecules to Populations PPEM 416 3 credits | Lab of General and Applied Microbiology MICRB 421W 3 credits |
| Environmental Organic Chemistry, C E 5733 credits | Biology of FungiPPEM 4254 credits | Polymer Chemistry (co-listed with Chem) MATSE 543 or CHEM 543, 3 credits | Environmental Aquatic Chemistry C E 5703 credits | Responses of Crop Plants to Environmental Stress AGRO 518 3 credits | Laboratory in Proteins, Nucleic Acids and MolecularCloning B M B 442 3 credits |
| Bioinorganic ChemistryBMMB 538 3 credits | Virus EcologyPPEM 4543 credits | Functional Polymeric Materials MATSE 575 3 credits | Biological Treatment Processes C E 5723 credits | Ecology of Agricultural Systems AGRO 510 3 credits | MICRB 412 Microbial Biotechnology2 credits |
| Physical Chemistry with Biological Applications B M B 428 3 credits | Applied Microbial Ecology PPEM 4563 credits | Solid and Hazardous Wastes C E 476 3 credits | Groundwater Remediation C E 5783 credits | BioclimatologyMETEO 5633 credits | Molecular Biology LabMCIBS 5933 credits |
| Global Carbon CycleMETEO 5613 credits |  | Soil PhysicsSOILS 5073-4 credits | Environmental Transport ProcessesC E 576 3 credits | Wetland EcologyGEOG 550 3 credits | Environmental Microbiomes: Concepts and Analysis Tools PPEM 440 3 credits |
|  |  |  |  |  | Computational Methods in Engineering CE 402, 3 credits |