**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 Geochemistry GEOSC 419  3 credits | Geomicrobiology  GEOSC 409W  3 credits | Soil Properties and Functions SOILS 502  3 credits | Geochemistry of Aqueous Systems, GEOSC 522  3 credits | Soil Ecology  SOILS 412W  3 credits | Introduction to Isotopes  GEOSC 416  3 credits |
| Mathematical Modeling in Geosciences, GEOSC 561  4 credits | Environmental Soil Microbiology  SOILS 512 3 credits | Surface Chemistry, CHEM 448, or Surface Characterization (CHE/MATSE 597A) 3 credits | Principles of Geochemistry  GEOSC 533  3 credits | Environmental Biophysics ERM 444  3 credits | Techniques in Environ. Geochemistry  GEOSC 413 3 credits |
| Marine Biogeochemistry GEOSC 411  3 credits | Biological Chemistry  CHEM 476  3 credits | Nature of Soil Minerals  SOILS 519  3 credits | GEOSC 452  Hydrogeology  3 credits | Ecology of Plant Roots  HORT 517  3 credits | Isotope Course Series, each 2 credits, GEOSC 518A, 518B, 518C, 518D |
| Evolution of the Biosphere GEOSC 502  4 credits | Environmental Microbiology for Engineers, C E 479  3 credits | Soil Genesis and Classification SOILS 416  3 credits | Hydropedology  SOILS 405  3 credits | Plant Nutrition  HORT 402W  3 credits | Analytical Separations,  CHEM 525  3 credits |
| Kinetics of Geochemical Processes, GEOSC 560  3 credits | General Biochemistry BMB 401 or 402  3 credits | Remediation of Contaminated Soils  SOILS 420 3 credits | Watershed Hydrology and Management, FOR 470  3 credits | Techniques and Concepts in Plant Ecophysiology  HORT 514 2 credits | Spectroscopic Analysis  CHEM 526  3 credits |
| Ecosystem Nutrient Cycles SOILS 571  3 credits | Lab in Molecular Genetics BMB 445W  3 credits | Soil Genesis  SOILS 516  1 credit | Unsaturated Zone Hydrology & Chemical Transport SOILS 504 3 cred | Microbe-Plant Interactions  PPEM 405  3 credits | Molecular Spectroscopy CHEM 567  3 credits |
| Biophysical Chemistry  CHEM 540  3 credits | Microbial Physiology and Structure MICRB 401 3 credits | Soil Environmental Chemistry SOILS 513  3 credits | Water Quality Chemistry  C E 475  3 credits | Fundamentals of Plant Pathology PPATH 505  3 credits | Spectroscopic Methods in Bioinorganic Chemistry  CHEM 538 3 credits |
| Physical Chemistry-Thermodynamics  CHEM 450 3 credits | Microbial Diversity MICRB 413  2 credits | Urban Soils  SOILS 404 3 credits | Groundwater Hydrology: Analysis and Modeling  C E 555 3 credits | Phytobacteriology  PPEM 417  3 credits | Computational Chemistry  CHEM 408 3 credits |
| Critical Zone Science Seminar, GEOSC 589, 2 credits | Biomolecular Structure  BMMB 531  2 credits | Soil Morphology Practicum SOILS 403  2 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 573  3 credits | Biology of Fungi  PPEM 425  4 credits | Polymer Chemistry (co-listed with Chem) MATSE 543 or CHEM 543, 3 credits | Environmental Aquatic Chemistry C E 570  3 credits | Responses of Crop Plants to Environmental Stress  AGRO 518 3 credits | Laboratory in Proteins, Nucleic Acids and Molecular  Cloning B M B 442 3 credits |
| Bioinorganic Chemistry  BMMB 538  3 credits | Virus Ecology  PPEM 454  3 credits | Functional Polymeric Materials MATSE 575  3 credits | Biological Treatment Processes C E 572  3 credits | Ecology of Agricultural Systems  AGRO 510 3 credits | MICRB 412 Microbial Biotechnology  2 credits |
| Physical Chemistry with Biological Applications  B M B 428 3 credits | Applied Microbial Ecology PPEM 456  3 credits | Solid and Hazardous Wastes  C E 476 3 credits | Groundwater Remediation  C E 578  3 credits | Bioclimatology  METEO 563  3 credits | Molecular Biology Lab  MCIBS 593  3 credits |
| Global Carbon Cycle  METEO 561  3 credits |  | Soil Physics  SOILS 507  3-4 credits | Environmental Transport Processes  C E 576 3 credits | Wetland Ecology  GEOG 550 3 credits | Environmental Microbiomes: Concepts and Analysis Tools PPEM 440 3 credits |
|  |  |  |  |  | Computational Methods in Engineering CE 402, 3 credits |