Bioinformatics and Computational Biology

Christopher J. Williams, Program Director (414 Brink.. 83844-1104; phone 208/885-2802; bcb@uidaho.edu; www.bcb.uidaho.edu).

Note: Most of the courses in this interdisciplinary program are in other academic departments and are not listed below. Please refer to the curricular requirements in Part 5 for a complete list of classes.

BCB WS-J478/WS-J578 Introduction to Bioinformatics (3 cr) WSU MBioS 478/578.

BCB 500 Master's Research and Thesis (cr arr)

BCB 501 (s) Seminar (cr arr)

BCB 502 (s) Directed Study (cr arr)

BCB 503 (s) Workshop (cr arr)

BCB 504 (s) Special Topics (cr arr)

BCB 506 Laboratory Experience in the Biological Sciences (cr arr)
Hands-on activities in an active research laboratory whose central research interests are in the biological or biochemical sciences.
Prereq: Admission to BCB program.

BCB 507 Laboratory Experience in the Computational Sciences (cr arr)
Hands-on activities in an active research laboratory whose central research interests are in the computational sciences.
Prereq: Admission to BCB program.

BCB 508 Laboratory Experience in Mathematics or Statistics (cr arr)
Hands-on activities in an active research laboratory whose central research interests are in the mathematics or statistics.
Prereq: Admission to BCB program.

BCB 516 (s) Biological Sciences Supplement (cr arr)
Supplemental material to a course taught in the biological or biochemical sciences. Supplements cover material specific to bioinformatics and computation biology that complement material taught in courses from other departments.
Prereq: Permission

BCB 517 (s) Computational Sciences Supplement (cr arr)
Supplemental material to a course taught in the computational sciences. Supplements cover material specific to bioinformatics and computation biology that complement material taught in courses from other departments.
Prereq: Permission

BCB 518 (s) Mathematics or Statistics Supplement (cr arr)
Supplemental material to a course taught in mathematics or statistics. Supplements cover material specific to bioinformatics and computation biology that complement material taught in courses from other departments.
Prereq: Permission

BCB WS578 Introduction to Bioinformatics (3 cr)
See BCB J478/J578.

BCB 597 (s) Practicum (cr arr)

BCB 598 (s) Internship (cr arr)

BCB 599 (s) Non-thesis Master's Research (cr arr)

BCB 600 Doctoral Research and Dissertation (cr arr)

Biological and Agricultural Engineering

Jon H. Van Gerpen, Dept. Head, Department of Biological and Agricultural Engineering (421 Engineering/Physics Bldg. 83844-0904; phone 208/885-6182; fax 208/885-7908; baengr@uidaho.edu).

Note: All 300, 400, and 500-level biological and agricultural engineering courses require a working knowledge of computers, structured programming, electronic spreadsheets, and word processing.

BAE 142 Engineering for Living Systems (2 cr)
Introduction to engineering principles used to solve agricultural and biological systems problems, including use of computers. One lec and one 3-hr lab a wk; two half-day field trips.

BAE 143 Engineering Problem Solving (2 cr)
Engineering principles used to solve agricultural and biological systems problems, including computer programming; introduction to elements of design.

BAE 242 Engineering Analysis and Design (2 cr)
Methods of analyzing and solving engineering problems and introduction to elements of design; use of computers in engineering problem solving. Recommended Preparation: BAE 143 or computer science elective in a programming language.
Prereq: Math 170
Coreq: Math 175

BAE 299 (s) Directed Study (cr arr)

BAE ID&WS310 Biological Dynamics for System Design (3 cr) WSU BSysE 310
Modeling and analysis of biological systems including microbial growth, population dynamics, enzyme kinetics, photosynthesis, respiration, and animal energetics and behavior for designing plant, animal, and microbial systems. Two lec and three hours of lab a wk. Recommended Preparation: BAE 242, Biol 115, Math 310, and Soil 205, 206 or MMBB 250, 255.

BAE ID351 Hydrology (3 cr) WSU BSysE 353
Analysis of precipitation and runoff events; principles of climatology, evaporation, infiltration, and snowmelt. Recommended Preparation: one semester of calculus.

BAE 355 Fundamentals of Hydrologic Engineering (3 cr)
See CE 325.

BAE 356 Hydrologic Measurement Techniques (1 cr)
See CE 326.

BAE ID&WS372 Agricultural Power and Machines (3 cr) WSU BSysE 362
Performance, operation, and testing of agricultural power units and machinery; functional requirements, force analysis, power transmission, safety, and economics. Two lec and three hrs of lab a wk; one 1-day field trip.

BAE WS386 Mechanics of Biomaterials (4 cr) WSU BSysE 320
Composition of biological materials, mechanical and thermal properties, chemical and biological changes. Two lec and one 3-hr lab a wk. Recommended Preparation: Engr 335 and 350.

BAE 398 (s) Engineering Cooperative Internship (cr arr)
Supervised internship in professional engineering settings, integrating academic study with work experience; details of the co-op to be arranged with supervising professor before the start of the co-op; requires written report. Graded P/F. Cannot be used for technical elective.
Prereq: Permission

BAE 404 (s) Special Topics (cr arr)

BAE ID-J432/ID-J532 Bioreactor Theory and Design for Waste Treatment (3 cr)
BAE 532 same as EnvE 544. Theory of biological waste treatment as applied to wastewaters, including reaction kinetics, reactor theory and design, reaction stoichiometry, microbiology, gas transfer theory, suspended growth and attached growth process theory and design, and separation of biological solids. Graduate credit requires additional design project. One field trip.
Prereq: Chem 112, Math 310, and Biol 115 or MMBB 250, 255

BAE J433/J533 Bioremediation (3 cr)
BAE 533 same as EnvE 533. Theory and practice of bioremediation as applied to toxic and hazardous wastes, including reaction kinetics, reaction stoichiometry, microbiology, and design of ex- and in-situ processes. Graduate credit requires additional design project. One-two field trips.
Prereq: Biol 115 and Math 170, or Permission

BAE ID&WS-J441/ID&WS-J541 Instrumentation and Measurements (3 cr) WSU BSysE 541
Sensing elements, signal conditioning, data output and control. Additional projects/assignments reqd for grad cr. Two lec and one 3-hr lab a wk. Recommended Preparation: BAE 462.

BAE 450 Environmental Hydrology (3 cr)
Carries no credit after BAE 351, BAE 355 or CE 325. The objective of this course is to provide a comprehensive understanding of the hydrologic processes associated with the environmental processes. Includes components of the hydrologic cycle, analysis of precipitation and run off, evapotranspiration, routing, peak flow, infiltration, soil and water relationships, snowmelt, and frequency analysis. (Spring only)
Prereq: Math 170

BAE ID451 Engineering Hydrology (3 cr) WSU BSysE 451
See CE 421.

BAE ID&WS-J452/ID&WS-J552 Environmental Water Quality (3 cr)
WSU BSysE 452. Engineering design to monitor, evaluate, and minimize non-point pollution from agriculture, environmentally acceptable disposal of wastes, bioremediation. Graduate credit requires an additional project and report. Two lec and one 3-hr lab a wk.
Prereq: Chem 112 and Soil 205 or MMBB 250, and BAE 355 or BAE 450

BAE 458 Open Channel Hydraulics (3 cr)
Same as CE 428. Hydraulics of uniform and varied flow in open channels with fixed and movable beds. Recommended Preparation: CE 322.

BAE ID&WS-J459/J559 Irrigation System Design (3 cr) WSU BSysE 453
Crop water requirements, irrigation scheduling and water management, selection and design of irrigation systems, pump selection. Additional projects/assignments reqd for grad cr. Two lec and one 3-hr lab a wk; one 1-day field trip.
Prereq: Engr 335

BAE ID&WS461 Bioprocess Engineering (3 cr) WSU BSysE 461
Carries 2 credits after ME 345. Processing principles and transport processes applied to the analysis and design of handling, processing, and producing of biomaterials and bioprocesses. Two lec and one 3-hr lab a wk. (Spring only, alt/yrs)
Prereq: Math 310, Engr 320 and 335, or Permission

BAE ID&WS462 Electric Power and Controls (3 cr) WSU BSysE 380
Design, selection, and use of electrical equipment and electric power systems for application to biological systems; design and use of electrical, electronic, and other feedback control systems for use with biological systems. Two lec and one 3-hr lab a wk.
Prereq: Engr 240
Coreq: Math 310

BAE WS-J465/WS-J565 Surface Hydrologic Processes and Modeling (3 cr) WSU BSysE 456/556

BAE 478 Engineering Design I (3 cr)
May be used as core credit in J-3-d. Intro to design process, CAD/CAM facility, product liability, and project scheduling; formulation of a design problem.
Prereq: Senior standing or Permission

BAE 479 Engineering Design II (3 cr)
May be used as core credit in J-3-d. Individual or team design of an agricultural related problem; incl synthesis, analysis, construction, and testing; final report reqd. Two 3-hr labs a wk. Recommended Preparation: BAE 478.

BAE WS482 Food Process Engineering Design (3 cr) WSU BSysE 482
Fundamentals for design of food processing systems; food properties; thermal and physical processes.
Prereq: FST 433

BAE WS483 Food Separation Processes Design (3 cr) WSU BSysE 483

BAE WS-J486/WS-J586 Food Rheology (3 cr) WSU BSysE 486/586

BAE 491 Senior Seminar (1 cr)
Professional aspects of the field, employment opportunities and preparation of occupational inventories. Graded P/F.
Prereq: Senior standing.

BAE 499 (s) Directed Study (cr arr)

BAE 500 Master's Research and Thesis (cr arr)

BAE 501 (s) Seminar (cr arr)
Graded P/F.
Prereq: Permission

BAE 502 (s) Directed Study (cr arr)

BAE ID532 Bioreactor Theory and Design for Waste Treatment (3 cr)
See BAE J432/J532.

BAE 533 Bioremediation (3 cr)
See BAE J433/J533.

BAE 534 Applied Bioremediation (3 cr)
Same as EnvE 535. Application of theory and design learned in prerequisite BAE 433/533 including conducting treatability studies, transportation and fate modeling in the subsurface, and hydrologic testing. Students required to complete laboratory, numerical modeling, and field-testing modules in addition to a subsurface modeling project.
Prereq: BAE 433/533

BAE ID&WS541 Instrumentation and Measurements (3 cr)
See BAE J441/J541.

BAE 550 Natural Channel Flow (3 cr) (BAE 555)
Same as CE 529. Hydraulics of nonuniform flow in irregular channels, unsteady flow, and flow routing.

BAE ID551 Advanced Hydrology (3 cr) WSU BSysE 550
Principles of the hydrologic cycle including precipitation, lower atmosphere, evaporation, fluid mechanics of free surface flow, overland flow, stream flow routing, water transport in porous media, infiltration, groundwater outflow and base flow, stream flow generation, and elements of frequency analysis in hydrology.
Prereq: BAE 335; or BAE 450 and Math 310; or Permission

BAE ID&WS552 Environmental Water Quality (3 cr)
See BAE J452/J552.

BAE ID558 Fluid Mechanics of Porous Materials (3 cr) WSU BSysE 558
Statics and dynamics of multiflow systems in porous materials; properties of porous materials; steady and unsteady flow.

BAE 559 Irrigation System Design (3 cr)
See BAE J459/J559.

BAE WS565 Surface Hydrologic Processes and Modeling (3 cr) WSU BSysE 556
See BAE J465/J565.

BAE WS582 Food Process Engineering Design (3 cr)
See BAE J482/J582.

BAE 599 (s) Non-thesis Master's Research (cr arr)
Research not directly related to a thesis or dissertation.
Prereq: Permission

BAE 600 Doctoral Research and Dissertation (cr arr)

Biology

Joseph G. Cloud, Dept. Chair, Dept. of Biological Sciences (252 Life Sc. Bldg. 83844-3051; phone 208/885-6280).

Exception to regulation D-4: Students who transfer in a course for which the UI requires Biol 115 or 116 as a prerequisite (but who have not yet taken Biol 115 or 116), may take Biol 115 and 116 for credit.

Note: Enrollment in lab sections of departmental courses will be limited to the number of stations available in that section.

Biol 102 Biology and Society (4 cr)
May be used as core credit in J-3-b. Not open to Biology majors or for minor cr. Principles of biology and their relationship to social issues. Three lec and one 3-hr lab a wk.

Biol 115 Cells and the Evolution of Life (4 cr)
May be used as core credit in J-3-b. The cell, heredity and evolutionary processes. Three lec and one 3-hr lab a wk.
Coreq: Chem 101 or 111

Biol 116 Organisms and Environments (4 cr)

May be used as core credit in J-3-b . The evolution of diversity, the biology of plants and animals, and their environments. Three lec and one 3-hr lab a wk.
Prereq: Biol 115 and Chem 101 or 111

Biol 120 Human Anatomy (4 cr)
Study of the anatomy of the major organ systems of the human body; lab consists of studying human gross anatomy models and prosected cadavers. Three lec and one 3-hr lab a wk. (Fall only).

Biol 121 Human Physiology (4 cr)
May be used as core credit in J-3-d. Study of the physiology of the major organ systems of the human body. Three lec and one 3-hr lab a wk. (Spring only)
Prereq: Biol 120

Biol 210 Genetics (4 cr)
Genetic mechanisms in animals, plants, and microorganisms. Three lec and one 3-hr lab a wk. (Fall only)
Prereq: Biol 115 or MMBB 250

Biol 212 Molecular and Cellular Biology (4 cr)
Current theory and experimental basis of the structure/function of eukaryotic cells. Topics include plasma membrane, organelles, cytoskeleton and cell mobility, the nature of genes, gene expression, DNA replication and cellular reproduction, and signal transduction. Three lec and one 3-hr lab a wk. (Fall only)
Prereq: Biol 115.

Biol 213 Principles of Biological Structure and Function (4 cr)
Principles of physiology in plants and animals (homeostasis, hormonal and neural control systems, organismal physiology). Three lec and one 3-hr lab a wk. (Spring only)
Prereq: Biol 115 and 116

Biol 311 Plant Physiology (4 cr)
Study of the physiology of plant tissues. Three lec and one 3-hr lab a wk. (Fall, alt/yrs)
Prereq: Biol 213, and Chem 275 or 277

Biol 314 Ecology and Population Biology (4 cr)
Nutrient cycling and energy flow, populations, population genetics, use and construction of phylogenies, communities and biodiversity. Three lec and one 3-hr lab a wk. (Spring only)
Prereq: Biol 115 and 116; and Math 143, 160, or 170. Biol 210 recommended

Biol WS324 Comparative Vertebrate Anatomy (4 cr) WSU Biol 324
General vertebrate anatomy and evolutionary changes in organ systems. Two lec and two 3-hr labs a wk.
Prereq: Biol 115 and 116

Biol 341 Systematic Botany (3 cr)
Classification and identification of flowering plants; local flora. Two 1-hr lec and two 2-hr labs a wk; four 1-day field trips. (Spring only)
Prereq: Biol 115 and 116.

Biol 354 Experimental Approaches in the Biological Sciences (3 cr)
Experimental analysis of biological systems. (Fall only)
Prereq: Biol 210, 212, and 213, or Permission

Biol 398 (s) Internship (1-3 cr, max 3)
Supervised internship in professional biological, non-university settings, integrating academic study with work experience; requires formal written plan of activities to be approved by academic advisor and department chair before engaging in the work; a final written report will be evaluated by on-campus faculty. Graded P/F.
Prereq: Permission

Biol 405 Practicum in Anatomy Laboratory Teaching (2 cr)
Organization, preparation, and teaching of anatomy laboratory objectives under faculty supervision. (Fall only)
Prereq: Permission

Biol 407 Practicum in Biology Laboratory Teaching (4-6 cr)
Organization, preparation, and teaching of lab experiments or demonstrations under faculty supervision.
Prereq: Any four of the following courses: Biol 115, 116, 210, 212, 213, or 314; and Permission

Biol 411 Senior Capstone (2 cr)
May be used as core credit in J-3-d. Application of biological principles and information to the analysis of societal and philosophical issues.
Prereq: Biol 210, 212, 213, 314, and Sr standing

Biol WS-J415/WS-J515 Plant Environmental Biophysics (2 cr) WSU ES/RP and SoilS 414/514

Biol ID&WS-J417/ID&WS-J517 Endocrine Physiology (3 cr)
See AVS J451/J551.

Biol 421 Advanced Evolutionary Biology (3 cr)
Macro and Micro evolutionary patterns and processes examined from molecular, ecological, and paleontological perspectives. (Fall only)
Prereq: Biol 314 or For/Rnge/WLF 221

Biol 423 Comparative Vertebrate Physiology (4 cr)
Comparative physiology of the major organ systems found in vertebrates. Additional projects/assignments reqd for grad cr. May involve some evening exams. (Fall only)
Prereq: Biol 213, and Chem 275 or 277

Biol 425 Special Topics: Experimental Field Ecology (3 cr)
Intensive course on diverse aspects of field ecology to be held off-campus. Various global locations (i.e. Costa Rica, Oregon coast, Hawaii) are possible. The course will be scheduled during an 8-10 day period preceding/following the Spring Term (i.e. January or May). Will involve travel and lodging costs at student expense.
Prereq: Biol 115, 116, 210, 212, 213, and 314

Biol WS435 Limnology and Aquatic Ecosystem Management (3 cr) WSU ES/RP 411 and Zool 411
Prereq: Biol 115 and Chem 111

Biol WS-J436 Plant Environmental Biophysics Lab (1 cr) WSU ES/RP and SoilS 415

Biol 444 Genomics (3 cr)
Structural, functional, and comparative genomics of animals, plants, fungi, and microbes. Case studies illustrating a genomic approach to questions of fundamental biological and societal relevance will be drawn from diverse fields such as human medicine, evolutionary biology, agriculture, and bioterrorism. (Fall only)
Prereq: Biol 115, 116, 210 or MMBB 250

Biol 448 Plant-Animal Interactions (3 cr)
Principles of interactions between plants and animals; interactions and diversification, coevolution; pollination, fruit and seed dispersal, herbivory, ant-plant and ant-plant-fungal interactions, importance of interactions in conservation biology. One field trip. Biol 314 recommended. (Fall, Alt/yrs)
Prereq: Biol 116

Biol ID450 Comparative Vertebrate Reproduction (3 cr) WSU Biol 451/551
Physiology of major events in reproductive cycles of vertebrates. (Spring, Alt/yrs)
Prereq: Biol 116 and 213

Biol ID461 Neurobiology (3 cr) WSU Neuro 461
Study of the nervous system, with an emphasis on mechanisms of neuronal signaling, the function of sensory and motorsystems, and neural development. Recommended: Phys 111, Phys 112, and Chem 275 or 277. (Fall, Alt/yrs)
Prereq: Biol 213

Biol 474 Principles of Developmental Biology (3 cr)
Analysis of mechanisms at cellular and molecular level during metazoan development. (Spring, Alt/yrs)
Prereq: Biol 115 and 116 or Biol 212

Biol 478 Animal Behavior (3 cr)
Evolution, causation, development, and function of behavior in vertebrates and invertebrates. (Spring only)
Prereq: Biol 115 and 116

Biol 481 Ichthyology (4 cr)
Anatomy, taxonomy, physiology, genetics, and zoogeography of fishes. Three lec and one 3-hr lab a wk; one half-day field trip. (Spring only)
Prereq: Biol 115 and 116

Biol 483 Mammalogy (3 cr)
Evolution, systematics, distribution, and biology of mammals. Two lec and one 3-hr lab a wk; one field trip. (Fall only)
Prereq: Biol 115 and 116

Biol 484 Invertebrate Zoology (4 cr)
Morphology of freshwater, marine, and terrestrial invertebrates and phylogeny of major groups. Three lec and one 3-hr lab a wk.
Prereq: Biol 115 and 116

Biol 493 Practicum in Physical Therapy (1 cr, max 4)
Minimum of two hrs a wk of practical experience in a PT clinic. Graded P/F.
Prereq: Jr standing in pre-PT or related studies and perm of UI allied health advisor.

Biol 494 Insect Anatomy and Physiology (4 cr)
See Ent J484/J584.

Biol 495 Research in Molec/Cell/Dev Biology (cr arr)
Directed research in faculty laboratory.
Prereq: Permission

Biol 496 Research in Ecology and Evolution (cr arr)
Directed research in faculty laboratory.
Prereq: Permission

Biol 497 Research in Anatomy and Physiology (cr arr)
Directed research in faculty laboratory.
Prereq: Permission

Biol 499 (s) Directed Study (cr arr)

Biol 500 Master's Research and Thesis (cr arr)

Biol 501 (s) Seminar (cr arr)

Biol 502 (s) Directed Study (cr arr)

Biol 503 (s) Workshop (cr arr)

Biol 504 (s) Special Topics (cr arr)

Biol 505 Colloquium (1 cr)
Oral presentation reqd for cr. Graded P/F.
Prereq: Permission

Biol 507 (s) Research Topics in Biological Sciences (1 cr)
Seminars on research being carried out in the Department of Biological Sciences.

Biol 508 Topics in Neuroscience (1 cr, max arr)
Same as Neur 508. Seminars and discussion of current topics in neuroscience.
Prereq: Graduate standing

Biol WS509 Development and Plasticity of the Nervous System (3 cr) WSU Biol 553
A comparative approach to neural development and repair in invertebrates and vertebrates.
Prereq: Biol 210; and MMBB 300 or 380; and Biol 423 or a 400-level neurobiology course

Biol 510 Workshop on University Biology Teaching (1 cr)
Exploration of higher education science teaching, learning theories, learning styles, teaching methods and strategies, classroom ethics, web-based instruction, and lecture and lab design. Course requires attendance the Thursday and Friday before the beginning of Fall semester. Graded P/F. (Fall only)

Biol 512 Plant Growth Substances (3 cr)
Hormonal regulation of physiological processes. Two lec and one 2-hr disc a wk. (Alt/yrs)
Prereq: Biol 311 and organic chemistry

Biol 514 Readings in Neurobiology (1 cr, max arr)
Discussion of current neurobiology literature.
Prereq or **Coreq:** Biol 461/561, 509 or MedS 532

Biol WS515 Plant Environmental Biophysics (2 cr)
See Biol J415/J515.

Biol WS516 Advanced Neuroanatomy (4 cr) WSU Neuro/V An 513

Biol ID&WS517 Endocrine Physiology (3 cr)
See AVS J451/J551.

Biol WS518 Photosynthesis, Photorespiration, and Plant Productivity (3 cr) WSU Biol 518

Biol WS519 Experimental Methods in Plant Physiology (3 cr) WSU Biol 504

Biol 521 Graduate Teaching Practicum (3 cr)
Organization, preparation, and teaching of lab experiments or demonstrations under faculty supervision.
Prereq: Graduate standing and Permission

Biol 525 Readings in Ecological and Evolutionary Genetics (1 cr)
Seminars and discussion of current research in genetics as it applies to ecology and evolution. (Fall only)

Biol WS529 Cellular and Molecular Neurobiology (4 cr) WSU Neuro/V Ph 529

Biol R531 Environmental Science and Pollutants (3 cr)
Structure and function of ecosystems, sources and characteristics of hazardous materials, mechanisms and pathways of pollutant transport and degradation, mechanisms of pollutant impact on ecosystems and human health.
Prereq: Biol 102 or 115, and Chem 101 or 111

Biol 535 Plant Geography (3 cr)
Spatial relations of plants and plant communities as determined by intrinsic factors such as genetics and evolution, and extrinsic factors such as physiography, geography, climate, and climatic change; mechanisms of distribution, discontinuity patterns. One 3-day field trip. (Alt/yrs)
Prereq: Permission

Biol 539 Physiological Ecology (3 cr)
Physiological adaptations to various environmental and habitat conditions and their ecological consequences. Two lec and one 3-hr lab a wk. Recommended prereq: Biol 311.

Biol WS543 Ion Channels (3 cr) WSU Neuro 543

Biol 545 Principles of Systematic Biology (3 cr)
The inference of evolutionary trees (phylogeny) and the processes that generate biodiversity from analyses of morphological, molecular, and behavioral data; uses of phylogenies in testing evolutionary and other hypotheses at both inter and intraspecific levels. Additional projects/assignments reqd for grad cr. Two hrs of lec and one 3-hr lab a wk. (Spring, Alt/yrs)
Prereq: PlSc 205 or Biol 213 and Biol 210

Biol ID&WS548 Evolutionary Ecology (3 cr)
See WLF 548.

Biol 551 Seminar on Reproductive Biology (1 cr)
Current topics in reproductive biology.
Prereq: Graduate standing

Biol 552 Professional Development for Biologists (3 cr)
Oral and written presentation skills for communicating scientific information, including grant writing and data presentation for manuscripts and seminars. (Spring only)
Prereq: Graduate standing

Biol 553 Ethical Issues in Biological Research (1 cr)
Practical ethical issues for biologists. (Spring only)
Prereq: Graduate standing

Biol 557 Advanced Plant Molecular Biology (3 cr)
Molecular biology of plant organelles: structure of chloroplast and mitochondrial genomes and their replication; transcription, translation, and regulation of organelle genes and their interaction with nuclear genomes; genetic engineering of plant organelles-herbicide resistance, cytoplasmic male sterility.
Prereq: One semester of biochemistry and/or genetics

Biol ID558 Reproductive Biology of Fishes (2 cr) WSU Biol 511
A graduate level course covering all aspects of the reproductive biology of fishes. The class will meet once per week for 2 hours; the first hour will be used for a formal lecture, the second hour will be used for informal student presentations/discussion of current literature topics or assigned readings in the field. (Spring only, Alt/yrs)
Prereq: Graduate standing

Biol WS559 Molecular and Cellular Reproduction (3 cr) WSU MBioS 528
Prereq: AVS 452 or Biol 450/550

Biol 563 Mathematical Methods for Population Genetics and Evolution (3 cr)
See Math 563.

Biol 600 Doctoral Research and Dissertation (cr arr)