

Biology Teaching option

Outcome	Indicator	Rubric	Threshold
Demonstrate effective written and oral communication	WRIT 101	Completion of course entirely devoted to writing	≥C-
Demonstrate an understanding of physical and chemical factors that influence organisms, their physiology and ecosystem function	CHMY 141,143, 211 PHSX 205, 207 BCH 380 BIOE 370 BIOO 412 or 433 or BIOB 425	Completion of general and organic chemistry Completion of biochemistry or soil science Completion of general physics Selected questions on physiological ecology Selected questions on biogeochemistry, ecosystem ecology	≥C- ≥C- ≥C- >70% >70%
Demonstrate the ability to apply quantitative reasoning and appropriate mathematical and statistical methods to describe or explain phenomena in the natural world	MATH 171 STAT 216 or BIOB 318 BIOE 370 or BIOB 258	Completion of calc and one stat course Selected questions on population models in ecology	≥C- >70%
Demonstrate basic understanding of the major disciplines in biology including general biology, physiology, genetics, evolution, and ecology	BIOB 160, 170 or BIOB 256, 260 BIOO 412 or 433 BIOB 375 BIOB 420	Completion of course entirely devoted to physiology Completion of course entirely devoted to genetics Completion of course entirely devoted to evolution Completion of course entirely devoted to ecology Selected questions on ecology, physiology, genetics and evolution	≥C- ≥C- ≥C- ≥C- >70%
Understand the central concepts, tools of inquiry, and structures of the disciplines and can create standard-based learning experiences that make these aspects of subjects or content knowledge meaningful for students.	Praxis II Teaching Practicum FEPA Student Teaching FEPA TWS Graduate Survey Employer Survey	Praxis II Teaching Practicum FEPA Items 1-4 TWS Section 2 Student Teaching FEPA Items 1-4 Graduate Survey Items 1-2 Employer Survey Items 1-2	On average, students will perform at an acceptable or higher level on all indicators
Create learning environments that allow all students to be socially and academically successful, by validating students' cultural heritages, integrating their life experiences, and promoting their overall development; demonstrate knowledge, skills, and dispositions to address the instructional responsibilities needed to integrate Indian Education for All across the curriculum in a culturally responsive manner.	Signature Assignment Teaching Practicum FEPA Student Teaching FEPA TWS Graduate Survey Employer Survey	Signature Assignment – IEFA (211 D) Signature Assignment – Development (222/223) Teaching Practicum FEPA Items 5-9 TWS Section 1 Student Teaching FEPA Items 5-9 Graduate Survey Items 3-4 Employer Survey Items 3-4	On average, students will perform at an acceptable or higher level on all indicators
Understand and use a variety of instructional strategies to foster students'	Signature Assignment Teaching Practicum FEPA Student Teaching FEPA	Signature Assignment – Pedagogy (397/497) Signature Assignment –	On average, students will perform at an

Biology Teaching option

motivation for learning and encourage the development of students' conceptual understandings and performance/work force skill; use knowledge of effective communication techniques and make appropriate use of educational technology to support planning, instruction, and student learning.	TWS Graduate Survey Employer Survey	Comm/Inst Media (370)	acceptable or higher level on all indicators
		Teaching Practicum REPA Items 10-16	
		TWS Section 4	
		Student Teaching FEPA Items 10-16	
		Graduate Survey Items 5-7	
		Employer Survey Items 5-7	
Understand and demonstrate use of formal and informal assessment strategies and tools to direct planning of instruction for the continuous intellectual, social, and physical development of all learners including on-going pre-, formative and summative analysis of student learning, individually, in groups, and in whole class settings; plan lessons and instructional sequences based upon knowledge of subject matter, standards, learning outcomes, students and the community.	Signature Assignment Teaching Practicum FEPA Student Teaching FEPA TWS Graduate Survey Employer Survey	Signature Assignment – Planning (395)	On average, students will perform at an acceptable or higher level on all indicators
		Signature Assignment – Assessment (382)	
		Teaching Practicum REPA Items 17-20	
		TWS Sections 3 & 5	
		Student Teaching FEPA Items 17-20	
		Graduate Survey Items 8-9	
		Employer Survey Items 8-9	
Demonstrate the ability to reflect on classroom decision-making with regard to content, diversity, pedagogy and assessment in order to improve teaching and learning; are reflective practitioners that examine their own biases and endeavor to provide equitable educational opportunities for students; demonstrate an understanding that education happens in a context and develop effective relationships with family and community members.	Signature Assignment Teaching Practicum FEPA Student Teaching FEPA TWS Graduate Survey Employer Survey	Signature Assignment – Relationships (382)	On average, students will perform at an acceptable or higher level on all indicators
		Signature Assignment – Reflection (395)	
		Teaching Practicum REPA Items 21-27	
		TWS Section 6	
		Student Teaching FEPA Items 21-27	
		Graduate Survey Item 10	
		Employer Survey Item 10	

Biology Teaching

Learning Outcomes	Assessment Year			
	2011-2012	2012-2013	2013-2014	2014-2015
Demonstrate effective written and oral communication	X			
Demonstrate an understanding of physical and chemical factors that influence organisms, their physiology and ecosystem function		X		
Demonstrate basic understanding of the major disciplines in biology including general biology, physiology, genetics, evolution, and ecology			X	
Understand the central concepts, tools of inquiry, and structures of the disciplines and can create standard-based learning experiences that make these aspects of subjects or content knowledge meaningful for students				X
Create learning environments that allow all students to be socially and academically successful, by validating students' cultural heritages, integrating their life experiences, and promoting their overall development; demonstrate knowledge, skills, and dispositions to address the instructional responsibilities needed to integrate Indian Education for All across the curriculum in a culturally responsive manner.	X			
Understand and use a variety of instructional strategies to foster students' motivation for learning and encourage the development of students' conceptual understandings and performance/work force skill; use knowledge of effective communication techniques and make appropriate use of educational technology to support planning, instruction, and student learning		X		
Understand and demonstrate use of formal and informal assessment strategies and tools to direct planning of instruction for the continuous intellectual, social, and physical development of all learners including on-going pre-, formative and summative analysis of student learning, individually, in groups, and in whole class settings; plan lessons and instructional sequences based upon knowledge of subject matter, standards, learning outcomes, students and the community.			X	
Demonstrate the ability to reflect on classroom decision-making with regard to content, diversity, pedagogy and assessment in order to improve teaching and learning; are reflective practitioners that examine their own biases and endeavor to provide equitable educational opportunities for students; demonstrate an understanding that education happens in a context and develop effective relationships with family and community members.				X

Conservation Biology and Ecology Option			
Learning Outcome	Indicator	Rubric	Threshold
Demonstrate effective written and oral communication.	WRIT 201 COM 110 or CLS 101US BIOE 440 BIOE 455	Completion of course entirely devoted to writing Completion of course with heavy emphasis on speaking Scientific review paper Grant proposal and mock review panel	≥C- ≥C- ≥70% ≥70%
Demonstrate an understanding of physical and chemical factors that influence organisms, their physiology, and ecosystem function.	CHMY 141, 143, 211 BCHM 380 or ENSC 245 PHYX 205 BIOO 412 or BIOO 433 BIOE 428	Completion of general and organic chemistry Completion of biochemistry or soil science Completion of general physics Selected questions on physiological ecology Selected questions on biogeochemistry, ecosystem ecology	≥ C- ≥ C- ≥ C- ≥70% ≥70%
Demonstrate the ability to apply quantitative reasoning and appropriate mathematical and statistical methods to describe or explain phenomena in the natural world.	STAT 216, 217, 410 BIOE 370 BIOE 440	Completion of 3 semesters of statistics Selected questions on population models Selected questions on population models	≥ C- ≥70% ≥70%
Demonstrate basic understanding of the major disciplines in biology including physiology, genetics, evolution, ecology and systematics.	BIOO 412 or BIOO 433 BIOB 375 BIOB 420 BIOE 370 BIOO 415,475, 470 or BIOE 428 BIOB 480	Completion of course entirely devoted to physiology Completion of course entirely devoted to genetics Completion of course entirely devoted to evolution Completion of course entirely devoted to ecology Selected questions on ecology, physiology, genetics and evolution Selected questions on genetics and evolution	≥ C- ≥ C- ≥ C- ≥ C- ≥70% ≥70%
Demonstrate an understanding of the process by which scientific knowledge is generated and evaluated.	BIOB 103CS BIOE 440 BIOE 4## Cons Biol Res BIOE 455 BIO 428	Selected questions on scientific method Scientific review paper Selected assignments emphasizing analysis & hypothesis testing Grade on primary literature discussions Literature discussions and written interpretations	≥70% ≥70% ≥70% ≥70% ≥70%
Demonstrate the ability to use logic and reasoning to evaluate one's own work and the work of others.	PHL 236 BIOE 4## Cons Biol Res	Completion of course entirely devoted to formal logic Selected assignments emphasizing interpretation of data and inferences	≥ C- ≥70%
Demonstrate understanding of the major areas of population ecology, interspecific interactions and interactions with the physical environment.	BIOE 370 BIOE 428 or 455	Selected questions on population ecology, interspecific interactions and interactions with the abiotic environment Selected questions on population ecology, interspecific interactions and interactions with the abiotic environment	≥70% ≥70%
Demonstrate understanding of ecological patterns and processes at levels of organization above the population, including community ecology and ecosystem ecology	BIOE 370, 455, 428	Selected exam questions	≥70%

Demonstrate an understanding of the ways that ecological principles can be used to solve practical problems	BIOE 455 BIOE 428	Selected assignments or exam questions Selected exam questions	≥70% ≥70%
Demonstrate an understanding of current patterns of biodiversity and extinction, and why these patterns are of concern	BIOE 440	Selected essay questions	≥70%
Demonstrate an understanding of the ways that natural and human related factors alter population dynamics and extinction risk, community dynamics ecosystem function and evolutionary processes.	BIOE 440 BIOB 480 BIOE 428	Selected essay questions Selected exam questions Selected exam questions	≥70% ≥70% ≥70%
Demonstrate an understanding of the methods by which conservation problems are identified and addressed	BIOE 440 BIOE 440 BIOE 428	Review paper Selected essay questions Selected essay questions	≥70% ≥70% ≥70%
Demonstrate basic understanding of the ways that economic, legal and social issues affect conservation problems, policies and solutions	Social sciences block	Completion of 3 or more courses focusing entirely on environmental issues in economics, law or sociology	≥C-

Conservation Biology and Ecology

Learning Outcome	Assessment Year			
	2011-2012	2012-2013	2013-2014	2014-2015
Demonstrate effective written and oral communication.	X			
Demonstrate an understanding of physical and chemical factors that influence organisms, their physiology, and ecosystem function.		X		
Demonstrate the ability to apply quantitative reasoning and appropriate mathematical and statistical methods to describe or explain phenomena in the natural world.			X	
Demonstrate basic understanding of the major disciplines in biology including physiology, genetics, evolution, ecology and systematics.				X
Demonstrate an understanding of the process by which scientific knowledge is generated and evaluated.	X			
Demonstrate the ability to use logic and reasoning to evaluate one's own work and the work of others.		X		
Demonstrate understanding of the major areas of population ecology, interspecific interactions and interactions with the physical environment.			X	
Demonstrate understanding of ecological patterns and processes at levels of organization above the population, including community ecology and ecosystem ecology				X
Demonstrate an understanding of the ways that ecological principles can be used to solve practical problems	X			
Demonstrate an understanding of current patterns of biodiversity and extinction, and why these patterns are of concern		X		
Demonstrate an understanding of the ways that natural and human related factors alter population dynamics and extinction risk, community dynamics ecosystem function and evolutionary processes.			X	
Demonstrate an understanding of the methods by which conservation problems are identified and addressed				X
Demonstrate basic understanding of the ways that economic, legal and social issues affect conservation problems, policies and solutions	X			

Fish and Wildlife Management and Ecology Option			
Outcome	Indicator	Rubric	Threshold
Demonstrate effective written and oral communication	WILD 201	<5 grammatical errors on 4 written reports	70%
	WILD 401	Performance on 5 written assignments	70%
	WRIT 201/221; Com 110 or CLS 101	Successful completion of general and technical writing courses, public communication course	
Demonstrate an understanding of physical and chemical factors that influence organisms, their physiology and ecosystem function	CHMY 121,123, PHSX 205 GPHY 111 or ENSC 245 BIOE 370 BIOO 412	Successful completion of courses in chemistry, biochemistry, physics, general ecology, animal physiology, and soil resources or physical geography	70%
Demonstrate the ability to apply quantitative reasoning and appropriate mathematical and statistical methods to describe or explain phenomena in the natural world	STAT 216 or BIOB 318 BIOE 370	Successful completion of statistics or biometry course Test questions on population growth statistics in general ecology and wildlife ecology courses	70%
Demonstrate basic understanding of the major disciplines in biology including physiology, anatomy, genetics, evolution, ecology, and taxonomy	BIOO 230/310 BIOO 412 BIOB 375 or 377 BIOB 420 BIOO 415/475/470	Successful completion of courses in animal physiology, comparative anatomy, genetics, evolution, ecology, and animal and plant taxonomy	70%
Demonstrate an understanding of the process by which scientific knowledge is generated and evaluated	WILD 401	3 written assignments using scientific writing format and library searches for obtaining scientific information	70%
Demonstrate a basic understanding of demographic attributes of populations and the natural processes and the abiotic factors that influence population dynamics, as well as direct and indirect anthropogenic influences on populations	WILD 301	Quiz 2-4 short answer questions; Midterm-18 T/F, MC, short answer questions	70%
	BIOE 370/440	Successful completion of courses in fish and wildlife management, ecology, conservation biology or conservation genetics, freshwater ecology, and aquatic or terrestrial field ecology	70%
	BIOB 480		
	BIOE 428 BIOE 408 or 427		
Demonstrate a basic understanding of the variety of interactions among communities of organisms and the integration of communities into ecosystems	BIOE 370 BIOE 428	Successful completion of courses in general ecology, freshwater ecology, or plant ecology	70%

	BIOE 455		
Demonstrate awareness of historical, political, economic, and social factors in fish and wildlife management and natural resource conservation	WILD 301 BIOE 440 WILD 401	Quiz 1-5 short answer questions; Midterm-14 T/F, MC, short answer questions Successful completion of courses in conservation biology and fish and wildlife capstone course	70%
Demonstrate a basic understanding of fish and wildlife management and conservation techniques	WILD 301 WILD 401 BIOO 415/470/475	Quiz 3-5 short answer questions; Midterm-18 T/F, MC, short answer questions 3 written assignments Test questions on major techniques used to capture and monitor fish, birds, and mammals	70% 70%

Fish and Wildlife Management and Ecology Option

Learning Outcome	Assessment Year			
	2011-2012	2012-2013	2013-2014	2014-2015
Demonstrate effective written and oral communication.	X			
Demonstrate an understanding of physical and chemical factors that influence organisms, their physiology, and ecosystem function.		X		
Demonstrate the ability to apply quantitative reasoning and appropriate mathematical and statistical methods to describe or explain phenomena in the natural world.			X	
Demonstrate basic understanding of the major disciplines in biology including physiology, genetics, evolution, ecology and systematics.				X
Demonstrate an understanding of the process by which scientific knowledge is generated and evaluated.	X			
Demonstrate a basic understanding of demographic attributes of populations and the natural processes and the abiotic factors that influence population dynamics, as well as direct and indirect anthropogenic influences on populations		X		
Demonstrate a basic understanding of the variety of interactions among communities of organisms and the integration of communities into ecosystems			X	
Demonstrate awareness of historical, political, economic, and social factors in fish and wildlife management and natural resource conservation				X
Demonstrate a basic understanding of fish and wildlife management and conservation techniques	X			

Org Bio option

Outcome	Indicator	Rubric	Threshold
Demonstrate effective written and oral communication	WRIT 101 Com 110 or CLS 101	Completion of course entirely devoted to writing Completion of course with heavy emphasis on speaking	> = C- > = C-
Demonstrate an understanding of physical and chemical factors that influence organisms, their physiology and ecosystem function	CHMY 141,143, 211 PHSX 205, 207 BCH 380 BIOE 370	Completion of general and organic chemistry Completion of biochemistry Completion of general physics Completion of general ecology	> = C- > = C- > = C- > = C-
Demonstrate the ability to apply quantitative reasoning and appropriate mathematical and statistical methods to describe or explain phenomena in the natural world	MATH 171 STAT 216 or BIOB 318 BIOE 370 or BIOB 258	Completion of 1 semester of statistics Selected questions on population models in Ecology	>= C- >= 70% correct
Demonstrate basic understanding of the major disciplines in biology including general biology, physiology, genetics, evolution, and ecology	BIOB 160, 170 or BIOB 256, 260 BIOO 412 or 433 BIOB 375 BIOB 420	Completion of course entirely devoted to physiology Completion of course entirely devoted to genetics Completion of course entirely devoted to evolution Completion of course entirely devoted to ecology Selected questions on ecology, physiology, genetics and evolution Selected questions on genetics and evolution	> = C- >= C- >= C- >= C- >= 70%
Demonstrate critical thinking skills	Capstone	Graded presentation of reasoning	>= 70
Demonstrate inquiry skills and use of the scientific method for gaining knowledge	BIOB 170 lab	Required lab reports	>= 70
Demonstrate use of technology to effectively communicate results of literature reviews, research and analyses, and conclusions	Capstone courses	Graded presentation of techniques	>= 70
Demonstrate the ability to apply the interdisciplinary building blocks to understand integrated problems at the organism level	Capstone courses	Graded presentation of integration of concepts	>= 70
Demonstrate understanding of the relationship between genetics and evolution and the influence of these disciplines on organismal diversity	Capstone course	Written term paper	>= 70
Demonstrate an understanding of the hierarchy of biology including the organismal scale and including population, community, and ecosystem ecological processes	Capstone Course	Written term paper	>= 70
Identify and declare in consultation with an advisor(s) an advanced area of biological and/or ecological emphasis based on previous coursework, experience, ability, and interest	Advising sessions	Documented declaration of advanced area and course list	100%
Identify and declare in consultation with an advisor(s) an academic theme for coursework directed toward a specific career that incorporates biological sciences	Advising sessions	Documented declaration of biological academic theme and course list	100%

Organismal Biology Option

Learning Outcome	Assessment Year			
	2011-2012	2012-2013	2013-2014	2014-2015
Demonstrate effective written and oral communication.	X			
Demonstrate an understanding of physical and chemical factors that influence organisms, their physiology, and ecosystem function.		X		
Demonstrate the ability to apply quantitative reasoning and appropriate mathematical and statistical methods to describe or explain phenomena in the natural world.			X	
Demonstrate basic understanding of the major disciplines in biology including physiology, genetics, evolution, ecology and systematics.				X
Demonstrate an understanding of the process by which scientific knowledge is generated and evaluated.	X			
Demonstrate the ability to use logic and reasoning to evaluate one's own work and the work of others.		X		
Demonstrate use of technology to effectively communicate results of literature reviews, research and analyses, and conclusions			X	
Demonstrate the ability to apply the interdisciplinary building blocks to understand integrated problems at the organism level				X
Demonstrate understanding of the relationship between genetics and evolution and the influence of these disciplines on organismal diversity	X			
Demonstrate an understanding of the hierarchy of biology including the organismal scale and including population, community, and ecosystem ecological processes		X		
Identify and declare in consultation with an advisor(s) an advanced area of biological and/or ecological emphasis based on previous coursework, experience, ability, and interest			X	
Identify and declare in consultation with an advisor(s) an academic theme for coursework directed toward a specific career that incorporates biological sciences				X