1-20-2017

Educational Policies Committee Program Proposal, College of Natural Resources, January 20, 2017 - BS: Management and Restoration of Aquatic Ecosystems

Utah State University

Utah System of Higher Education
New Academic Program Proposal
Cover/Signature Page - Abbreviated Template

Institution Submitting Request:	Utah State University
Proposed or Current Program Title:	BS: Management and Restoration of Aquatic Ecosystems
Sponsoring School, College, or Division:	Quinney College of Natural Resources
Sponsoring Academic Department(s) or Unit(s):	Dept. of Watershed Sciences
Classification of Instructional Program Code[1] :	03.0205
Min/Max Credit Hours Required of Full Program:	Min Cr Hr / Max Cr Hr
Proposed Beginning Term[2]:	Fall 2017
Institutional Board of Trustees' Approval Date:	01/06/2017

☐	Certificate of Proficiency ☐ Entry-level CTE CP ☐ Mid-level CP
☐	Certificate of Completion
☐	Minor
☐	Graduate Certificate
☐	K-12 Endorsement Program
☒	NEW Emphasis for Regent-Approved Program
	Current Program BOR Approval Date: 07/15/2016
	Proposed Emphasis Title Aquatic Habitats
	Credit Hours for NEW Emphasis Only: 21 Cr Hr require / Max Cr Hr
	Proposed Emphasis Title Water Quality
	Credit Hours for NEW Emphasis Only: 21 Cr Hr require / Max Cr Hr
	Proposed Emphasis Title Hydrology and Water Resources
	Credit Hours for NEW Emphasis Only: 21 Cr Hr require / Max Cr Hr
	Proposed Emphasis Title Geomorphology
	Credit Hours for NEW Emphasis Only: 21 Cr Hr require / Max Cr Hr
	Proposed Emphasis Title Human Dimensions
	Credit Hours for NEW Emphasis Only: 21 Cr Hr require / Max Cr Hr
	Propose a NEW Emphasis

[1] For CIP code classifications, please see http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55.
[2] "Proposed Beginning Term" refers to first term after Regent approval that students may declare this program.

Utah System of Higher Education
Program Description - Abbreviated Template

Section I: The Request

Utah State University requests approval to offer the following Degree: BS: Management and Restoration of Aquatic Ecosystems with emphases effective Fall 2017. This program was approved by the institutional Board of Trustees on **January 6, 2017**.

Section II: Program Proposal/Needs Assessment

Program Description/Rationale

Present a brief program description. Describe the institutional procedures used to arrive at a decision to offer the program. Briefly indicate why such a program should be initiated. State how the institution and the USHE benefit by offering the proposed program. Provide evidence of student interest and demand that supports potential program enrollment.

Propose adding five areas of emphasis for the WATS major in *Management and Restoration of Aquatic Ecosystems*. The major currently requires a minimum of 21 elective credits. At present, the electives are without specific organization and are selected by the student and advisor. The major accommodates students with a range of interests, from biological conservation, to water quality protection, to hydrology, to the human dimensions of aquatic ecosystem management. It is believed that a focused achievement of expertise, noted on the student's transcript, can aid students in finding employment. The proposed areas of emphasis are (i) aquatic habitats, (ii) water quality, (iii) hydrology and water resources, (iv) geomorphology, and (v) human dimensions. These areas of emphasis do not expand or shift the direction of the major. Rather, they serve to encourage and document achievement in a way that will help to attract, focus, and employ majors.

The areas of emphasis were developed by the WATS Undergraduate Curriculum Committee and the department head and were discussed in a meeting of the full department faculty.

The proposed areas of emphasis are part of an effort to update and direct the major in a direction that matches the faculty competence in management and restoration with student interest in environmental improvement and employment opportunities in the field. A class will be added on the principles of aquatic ecosystem restoration and a required capstone professional class in order to provide background and experience as preparation for the job market.

Labor Market Demand

Provide local, state, and/or national labor market data that speak to the need for this program. Occupational demand, wage, and number of annual openings information may be found at sources such as Utah DWS Occupation Information Data Viewer (jobs.utah.gov/jsp/wi/utalmis/gotoOccinfo.do) and the Occupation Outlook Handbook (www.bls.gov/oco).

Placement of recent BS graduates is close to 100%. The faculty are frequently contacted regarding openings in private consultancies, state, local, and federal agencies, and NGOs. This local experience is supported by information from the US BLS Occupational Outlook Handbook for the four occupations requiring a BS that are closest to the major: Hydrologist, Geoscientist, Environmental Scientist and Specialist, Conservation Scientist and Forester. For these four occupations, the 2014-24: job outlook is 7% - 11% (Average to Faster than Average) and 2015 Median Pay is well above average, $60,000 - $90,000. The only comparable occupation in the Utah Occupation Information listings is Environmental Scientist and Specialist, which “should have good job opportunities. Compared to all occupations, wages for this occupation are very high.” The Utah listing notes that “job prospects are highest for conservation scientists and foresters who have a strong understanding of geographic information systems (GIS).” GIS and spatial data analysis is a feature of the major, with 6 required credits and a minor available in GIS.

Consistency with Institutional Mission/Impact on Other USHE Institutions

Explain how the program is consistent with the institution's Regents-approved mission, roles, and goals. Institutional mission and roles may be found at higheredutah.org/policies/policyr312/ . Indicate if the program will be delivered outside of designated service area; provide justification. Service areas are defined in higheredutah.org/policies/policyr315/ .

Focused Areas of Emphasis are part of the broader goal of educating students who will find useful and meaningful employment, while also providing rigorous training suitable for the best graduate schools. The areas of emphasis are also consistent with the deep faculty expertise in aquatic habitat restoration, water quality, hydrology, and geomorphology and the management context of all of these topics. Growth of the major will increase the number and quality of graduates with strong STEM credentials who are prepared to work in agency and private industry environmental positions.

Finances

What costs or savings are anticipated in implementing the proposed program? If new funds are required, indicate expected sources of funds. Describe any budgetary impact on other programs or units within the institution.

No new funds to incorporate the five Areas of Emphasis in the major. The major is currently staffed but undersubscribed. It is anticipated that there will be growth in existing classes and in the number of majors. The only long-term financial change is a growth in student credit hours for WATS classes.

Section III: Curriculum

Program Curriculum

List all courses, including new courses, to be offered in the proposed program by prefix, number, title, and credit hours (or credit equivalences). Indicate new courses with an X in the appropriate columns. The total number of credit hours should reflect the number of credits required to receive the award. For NEW Emphases, skip to emphases tables below.
For variable credits, please enter the minimum value in the table below for credit hours. To explain variable credit in detail as well as any additional information, use the narrative box below.

Can students complete this degree without emphases? *Yes or* X *No*

		Course Number	NEW Course	Course Title	Credit Hours
		General Education Courses (list specific courses if recommended for this program on Degree Map)			
				General Education Credit Hour Sub-Total	
		Required Courses			
+	-				
+	-				
				Required Course Credit Hour Sub-Total	
		Elective Courses			
+	-				
				Elective Credit Hour Sub-Total	
				Core Curriculum Credit Hour Sub-Total	0

	Course Number	NEW Course	Course Title	Credit Hours
	Name of Emphasis:		Aquatic Habitats	
+ -	WATS 4650		Principles in Fishery Management	3
+ -	WATS 5310	X	Ecology and Restoration of Wetland and Riparian Plants	3
+ -	WATS 5550		Freshwater Invertebrates	3
+ -	ENVS 4110		Human Dimensions Wildlife Management	3
+ -	PSC 3000		Fundamentals of Soil Science	4
+ -	WATS 5200		Fish Habitats	2
+ -	WILD 4600		Conservation Biology	3
			Emphasis Credit Hour Sub-Total	21
			Total Number of Credits to Complete Program	21
	Remove this emphasis			

	Course Number	NEW Course	Course Title	Credit Hours
	Name of Emphasis:		Water Quality	
+ -	CHEM 1220		Principles of Chemistry II	4
+ -	CHEM 1225		Chemical Principles Laboratory II	1
+ -	CEE 5610		Environmental Quality Analysis	3
+ -	WATS 5550		Freshwater Invertebrates	3
+ -	GEO 5510		Groundwater Geology	3
+ -	PSC 3000		Fundamentals of Soil Science	4
+ -	WATS 5310	X	Ecology and Restoration of Wetland and Riparian Plants	3
			Emphasis Credit Hour Sub-Total	21
			Total Number of Credits to Complete Program	21
	Remove this emphasis			

	Course Number	NEW Course	Course Title	Credit Hours
	Name of Emphasis:		Hydrology and Water Resources	
+ -	MATH 1220		Calculus II	4
+ -	MATH 2250		Linear Algebra and Differential Equations	4
+ -	CEE 3500		Fluid Mechanics	3
+ -	CEE 4200		Engineering Economics	2
+ -	CEE 5460		Water Resources Engineering	3
+ -	WATS 3600		Geomorphology	3
+ -	WATS 5330		Large River Management	3
			Emphasis Credit Hour Sub-Total	22
			Total Number of Credits to Complete Program	22
	Remove this emphasis			

	Course Number	NEW Course	Course Title	Credit Hours
	Name of Emphasis:		Geomorphology	
+ -	GEO 3200		The Earth Through Time	4
+ -	WATS 3600		Geomorphology	3
+ -	GEO 3550		Sedimentation and Stratigraphy	4
+ -	GEO 3700		Structural Geology	4
+ -	WATS 5310	X	Ecology and Restoration of Wetland and Riparian Plants	3
+ -	WATS 5330		Large River Management	3

	Course Number	NEW Course	Course Title	Credit Hours
			Emphasis Credit Hour Sub-Total	21
			Total Number of Credits to Complete Program	21
	Remove this emphasis			

	Course Number	NEW Course	Course Title	Credit Hours
	Name of Emphasis:		Human Dimensions	
+ -	ENVS 4020		Environmental History & Ethics	3
+ -	SOC 4620		Sociology of the Environment and Natural Resources	3
+ -	WATS 5330		Large River Management	3
+ -	ENVS 3500		Quantitative Assessment of Environmental and NR Problems	3
+ -	CEE 3610		Environmental Management	3
+ -	SOC 4640		Managing Community Conflict	3
+ -	GEOG 4400		Natural Hazards and Society	3
			Emphasis Credit Hour Sub-Total	21
			Total Number of Credits to Complete Program	21
	Remove this emphasis			

Propose a NEW Emphasis to an existing Regent approved program

Program Curriculum Narrative

Describe any variable credits. You may also include additional curriculum information, as needed.

The courses listed in the above tables are an ***example*** program of electives that would fulfill each Area of Emphasis. For context and completeness, ***attached separately*** are the Degree Requirements, which includes a more complete list of available electives in each area of emphasis.

The five Areas of Emphasis are defined in the Degree Requirements as follows:
Students majoring in Management and Restoration of Aquatic Ecosystems are required to select an emphasis of at least 21 credits. Students must develop an approved plan with their advisor no later than the first semester of their junior year and file an approved emphasis plan prior to applying for graduation.

Contacted all departments offering courses that have been identified as electives within the five areas of emphasis. No serious issues were raised in the responses received. One ongoing issue concerns prerequisites for CEE 3500 *Fluid Mechanics*, which is a core course for hydrology and a prerequisite for other courses in hydrology. CEE 3500 is at the heart of a structured curriculum for CEE majors and carries a long list of prerequisites. WATS majors may currently take CEE 3500 if they have taken the full suite of listed prerequisites. WATS and CEE faculty and Dept. Heads are engaged in a discussion of the necessary preparation for this class and whether the full list of prerequisites is needed. Currently conducting a `trial' with one student who appears well-qualified for the course but has not taken all prerequisites.

NOTE: Degree Map
The addition of areas of emphasis does not change the current degree map. Rather, it organizes and offers the opportunity to focus the 21 required credit hours of electives.

NOTE: Current Program BOR Approval Date
Approval of the name change of the major (*from* Watershed and Earth Systems *to* Management and Restoration of Aquatic Ecosystems) was made at the July 2016 meeting of the Board of Regents. The program (major) itself has been in existence since the reorganization of QCNR in 2002, if not earlier.

Degree Map

Degree maps pertain to undergraduate programs ONLY. Provide a degree map for proposed program. Degree Maps were approved by the State Board of Regents on July 17, 2014 as a degree completion measure. Degree maps or graduation plans are a suggested semester-by-semester class schedule that includes prefix, number, title, and semester hours. For more details see http://higheredutah.org/pdf/agendas/201407/TAB%20A%202014-7-18.pdf (Item #3).

Please cut-and-paste the degree map or manually enter the degree map in the table below