ACADEMIC SENATE PROPOSAL TRACKING SHEET

(Document To Be Originated By the Academic Senate Secretary On Canary Color Paper)

Proposal # 12-20	Title: Water Quality Technology Revisions

(Proposal explanation, submitter and college dean signatures on attached program/degree or course revision form.)

All proposals MUST have their originating college faculty body (Ex. Arts & Sciences, Education and Nursing; Technical Sciences) **approval and must be signed by the submitter and the college dean before being submitted to the Academic Senate Secretary.**

1. Submit all proposals (using the appropriate Academic Senate program/degree and/or course revision forms or General Education Inclusion form) to the Academic Senate Secretary. **NOTE: Level 1 or Level 2 forms must be submitted concurrent with this proposal where applicable. For Education proposals, PEU approval must be received prior to forwarding the proposal to the Senate.**

2. The Academic Senate Secretary logs and numbers items and forwards them to the appropriate Academic Senate subcommittee(s): General Education (if applicable), or Curriculum. A transmittal e-mail will be sent to the Recording Secretary of the receiving committee, cc Provost's Administrative Assistant, by the Academic Senate Secretary. A digital copy of the proposal will be linked on the Academic Senate Proposal page by the Academic Senate Secretary.

3. The Academic Senate subcommittee(s) consider(s) the proposal. If approved, the proposal is returned to the Academic Senate Secretary for forwarding to the next committee. If a committee disapproves the proposal, the originator may request that the item be forwarded to the next body for consideration. The committee will provide written rationale to the originator, via the Academic Senate, when a proposal is disapproved and the proposal is returned to the originator. Upon completion of committee action, the proposal will be returned to the Academic Senate Secretary, and a transmittal e-mail sent by the Committee Recorder to the Senate Secretary, cc Provost's Administrative Assistant.

4. The Academic Senate considers the proposal and recommends approval or disapproval. If approved, the proposal is forwarded to the Provost for consideration. If the Academic Senate disapproves the proposal, the originator may request that the item be forwarded to the Full Faculty for consideration, utilizing the procedures set forth in the Senate Bylaws. The Academic Senate will provide written rationale to the originator when proposals are disapproved and the proposal is returned to the originator.

5. Approved proposals will be forwarded to the Provost. The Provost approves or disapproves the proposal. If approved, the proposal is then forwarded to the Chancellor. From this point forward, the Provost's Administrative Assistant will update the Proposal page on the website by contacting the webmaster.

7. The Chancellor approves or disapproves the proposal.

8. The proposal will then either be implemented or referred to MSU for further action. The tracking page on the Provost site will be updated as required.

Subcommittee and Academic Senate college representatives will notify their respective colleges' of the progress of submitted proposals or the proposal may be tracked via the web page -- http://www.msun.edu/admin/provost/senate/proposals.htm

Documentation and forms for the curriculum process is also available on the web page: http://www.msun.edu/admin/provost/forms.htm

*****(If a proposal is disapproved at any level, it is returned through the Academic Senate secretary and the Senate President, to the Dean of the submitting college who then notifies the originator.**

See back for tracking form

	Date	Action Taken	Signature	Date	Comments/Reason for Disapproval	Sent to	Date	Transmittal E-mail sent
***Abstract received by Senate Secretary**		Copy to Senate President. Forward to Provost.						
***Provost**		☐ Abstract Approved ☐ Disapproved						
Received by Senate Secretary	12/06/12	Tracking form initiated	Tourdes Caren 12-6-12			Curriculum	12-6-12	12-6-12
General Education Committee (if applicable)		☐ Approved ☐ Disapproved						
Curriculum Committee (if applicable)		☐ Approved ☐ Disapproved						
Academic Senate		☐ Approved ☐ Disapproved						
Full Faculty (if necessary)		☐ Approved ☐ Disapproved						
Provost		☐ Approved ☐ Disapproved						
Chancellor		☐ Approved ☐ Disapproved						
MSU		☐ Approved ☐ Disapproved						
BOR		☐ Approved ☐ Disapproved						
NWCCU		☐ Approved ☐ Disapproved						
Provost		Advise originating college and Academic Senate of status. Update Web page.						
Registrar		Catalog/Policy Manual Update						

NOTE: The secretary of the Academic Senate will update the Academic Senate Proposal web page from initial receipt until the proposal reaches the Provost. The Provost's Administrative Assistant will ensure that the current status of each proposal is maintained on the Academic Senate Proposal web page from that point forward. ***Abstract and pre-approval required for new programs ONLY.**

PROGRAM/DEGREE REVISION FORM

NEW_X__ DROPPED_____ MAJOR REVISION_____ FOR INFORMATION ONLY_____

College CEASN **Program Area** Water Quality Technology **Date**________

Submitter Carol A. Reifschneider **Dean** [signature] **Date** 11-30-12

Signature — Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s).
These proposed certificate program in water quality technology – wastewater collection utilize courses offered for the AAS degree program with some of these courses being taught online. In addition, courses that are offered as part of the continuing education courses offered through the Montana Environmental Training Center would be included. These certificate programs can be completed in one year and provide the student the knowledge in the specialty area needed for employment.

Please provide in the space below a "before and after" picture of the program with the changes in the program noted. Attach appropriate Course Revision Forms. Please indicate changes by shading the appropriate cells.

PROPOSAL TITLE Water Quality Technology – Wastewater Collection Certificate

Current Program listed in 11-12 Catalog

Course Prefix	#	Course Title	Credits
		Total	

Proposed Program for 12-13 Catalog

Course Prefix	#	Course Title	Gen-Ed Credits	Degree Credits
		Core Courses		
TSCI	110	Introduction to Water and Wastewater		4
TSCI	1xx	Environmental Health and Safety for Water and Wastewater Operators		1
M	111	Technical Math		3
AGTE	206	Applied Water Hydraulics		3
TSCI	2xx	Spring, Summer or Fall Water School		2
TSCI	2xx	Backflow Assembly Testers Course		3
		Required Courses		
TSCI	2xx	Wastewater Collection Systems		3
TSCI	1xx	Pumps & Motors Operation and Maintenance		1
TSCI	2xx	Wastewater		1
		Elective Courses (6 credits)		
ELEC	101	Electrical Fundamentals I		3
PLMB	100	Introduction to the Plumbing Trades		4
PLMB	120	Introduction to Piping Systems		3
WLDG	111	Welding Theory I Practical		2
WLDG	260	Repair and Maintenance Welding		3
		Total		27

Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

PROGRAM/DEGREE REVISION FORM

NEW X **DROPPED**____ **MAJOR REVISION**____ **FOR INFORMATION ONLY**____

College CEASN **Program Area** Water Quality Technology **Date**____

Submitter [signature] **Dean** [signature] **Date** 11-30-12

Signature — Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s).

These proposed certificate program in water quality technology – wastewater treatment utilize courses offered for the AAS degree program with some of these courses being taught online. In addition, courses that are offered as part of the continuing education courses offered through the Montana Environmental Training Center would be included. These certificate programs can be completed in one year and provide the student the knowledge in the specialty area needed for employment.

Please provide in the space below a "before and after" picture of the program with the changes in the program noted. Attach appropriate Course Revision Forms. Please indicate changes by shading the appropriate cells.

PROPOSAL TITLE Water Quality Technology – Wastewater Treatment Certificate

Current Program listed in 11-12 Catalog

Course Prefix	#	Course Title	Credits
		Total	

Proposed Program for 12-13 Catalog

Course Prefix	#	Course Title	Gen-Ed Credits	Degree Credits
		Core Courses		
TSCI	110	Introduction to Water and Wastewater		4
TSCI	1xx	Environmental Health and Safety for Water and Wastewater Operators		1
M	111	Technical Math		3
AGTE	206	Applied Water Hydraulics		3
TSCI	2xx	Spring, Summer or Fall Water School		2
TSCI	2xx	Backflow Assembly Testers Course		3
		Required Courses		
TSCI	231	Wastewater Treatment Processes		3
TSCI	232	Wastewater Treatment Processes Lab		2
TSCI	1xx	Wastewater		1
TSCI	1xx	On-site Wastewater Systems		1
TSCI	2xx	Industrial Wastewater Treatment		1
		Elective Courses (5 credits)		
ELEC	101	Electrical Fundamentals I		3
PLMB	100	Introduction to the Plumbing Trades		4
PLMB	120	Introduction to Piping Systems		3
WLDG	111	Welding Theory I Practical		2
WLDG	260	Repair and Maintenance Welding		3
		Total		29

Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

PROGRAM/DEGREE REVISION FORM

NEW _X_ DROPPED____ MAJOR REVISION____ FOR INFORMATION ONLY____

College CEASN **Program Area** Water Quality Technology **Date**______

Submitter [signature] **Dean** [signature] **Date** 11-30-12

Signature — Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s).

These proposed certificate program in water quality technology – water distribution utilize courses offered for the AAS degree program with some of these courses being taught online. In addition, courses that are offered as part of the continuing education courses offered through the Montana Environmental Training Center would be included. These certificate programs can be completed in one year and provide the student the knowledge in the specialty area needed for employment.

Please provide in the space below a "before and after" picture of the program with the changes in the program noted. Attach appropriate Course Revision Forms. Please indicate changes by shading the appropriate cells.

PROPOSAL TITLE Water Quality Technology – Water Distribution Certificate

Current Program listed in 11-12 Catalog

Course Prefix	#	Course Title	Credits
		Total	

Proposed Program for 12-13 Catalog

Course Prefix	#	Course Title	Gen-Ed Credits	Degree Credits
		Core Courses		
TSCI	110	Introduction to Water and Wastewater		4
TSCI	1xx	Environmental Health and Safety for Water and Wastewater Operators		1
M	111	Technical Math		3
AGTE	206	Applied Water Hydraulics		3
TSCI	2xx	Spring, Summer or Fall Water School		2
TSCI	2xx	Backflow Assembly Testers Course		3
		Required Courses		
TSCI	205	Distribution Systems		3
TSCI	1xx	Operator Basics		1
TSCI	1xx	Pumps & Motors Operation & Maintenance		1
TSCI	1xx	Valves and Hydrants		1
		Elective Courses (5 credits)		
ELEC	101	Electrical Fundamentals I		3
PLMB	100	Introduction to the Plumbing Trades		4
PLMB	120	Introduction to Piping Systems		3
WLDG	111	Welding Theory I Practical		2
WLDG	260	Repair and Maintenance Welding		3
		Total		27

Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

PROGRAM/DEGREE REVISION FORM

NEW X **DROPPED**____ **MAJOR REVISION**____ **FOR INFORMATION ONLY**____

College CEASN **Program Area** Water Quality Technology **Date**____

Submitter [signature] **Dean** [signature] **Date** 11-30-12

Signature — Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s).
These proposed certificate program in water quality technology – water treatment utilize courses offered for the AAS degree program with some of these courses being taught online. In addition, courses that are offered as part of the continuing education courses offered through the Montana Environmental Training Center would be included. These certificate programs can be completed in one year and provide the student the knowledge in the specialty area needed for employment.

Please provide in the space below a "before and after" picture of the program with the changes in the program noted. Attach appropriate Course Revision Forms. Please indicate changes by shading the appropriate cells.

PROPOSAL TITLE Water Quality Technology – Water Treatment Certificate

Current Program listed in 11-12 Catalog

Course Prefix	#	Course Title	Credits
		Total	

Proposed Program for 12-13 Catalog

Course Prefix	#	Course Title	Gen-Ed Credits	Degree Credits
		Core Courses		
TSCI	110	Introduction to Water and Wastewater		4
TSCI	1xx	Environmental Health and Safety for Water and Wastewater Operators		1
M	111	Technical Math		3
AGTE	206	Applied Water Hydraulics		3
TSCI	2xx	Spring, Summer or Fall Water School		2
TSCI	2xx	Backflow Assembly Testers Course		3
		Required Courses		
TSCI	230	Introduction to Groundwater Concepts		3
TSCI	233	Water Treatment Processes		3
TSCI	234	Water Treatment Processes Lab		2
TSCI	1xx	Operator Basics		1
		Elective Courses (4 credits)		
ELEC	101	Electrical Fundamentals I		3
PLMB	100	Introduction to the Plumbing Trades		4
PLMB	120	Introduction to Piping Systems		3
WLDG	111	Welding Theory I Practical		2
WLDG	260	Repair and Maintenance Welding		3
		Total		29

Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

Montana Board of Regents

CURRICULUM PROPOSALS

1. Overview

The purpose of this curriculum proposal is to add four departmental certificate programs to MSU-Northern's Water Quality Technology: Environmental Health Associate of Applied Science (AAS) degree program. This proposal is unique and innovative in that it utilizes 1) courses that are already a part of the AAS Water Quality Technology program as well as 2) courses that are already a part of the Montana Environmental Training Center's (METC) programs, which is housed at MSU-Northern, to recertify licensed water treatment, water distribution system, wastewater treatment, industrial wastewater and on-site wastewater operators in the state of Montana.

2. Provide a one paragraph description of the proposed program. Be specific about what degree, major, minor or option is sought.

To obtain a departmental certificate in one of the four water quality technology disciplines (Water Distribution, Wastewater Collection, Water Treatment or Wastewater Treatment), the program requires completion of all classes specifically designed for each of the four certificate programs. The curriculum is multi-entry and can be completed in one year. Classes are offered using various delivery methods such as on-line classes (Desire2Learn), classroom, and short courses. Students can begin a certificate program with any of the required classes at any time. After completing any one of the certificate programs students will have the basic knowledge needed for entry level employment in one of the four areas water distribution, wastewater collection, water treatment or wastewater treatment. Students will be ready to sit for the Montana State Certification Examination and become certified as an "Operator-in-Training" in their chosen field. Students will also have specific knowledge of drinking water and/or wastewater systems that employers have identified as pertinent for job applicants to have prior to employment. Or students can roll their one year certificate into their first year of the AAS degree in Water Quality Technology and only have one year left to complete the AAS Water Quality Technology degree.

3. Need

A. To what specific need is the institution responding in developing the proposed program?

The need for water and wastewater operators in municipal and private water and wastewater systems is nearing critical mass, not only nationally but right here in Montana, with the average age of certified operators being 45. Many more operators are retiring from systems than are entering systems especially in small systems, of which Montana has many. This proposal aims to bring students interested in working in both large and small municipalities and small municipalities into the field. Then provide them with enough information in one year that they can sit for the state certification exam and successfully pass the exam the first time. Hopefully by completing the certificate program they will see the value in the Water quality program and how close they are to having the AAS degree and continue on and complete the Water Quality Technology AAS degree thus making them even more valuable to an employer.

B. How will students and any other affected constituencies be served by the proposed program?

Those students looking to get into the work force quickly can complete one of the four certificates within one year, sit for a state exam and apply for a job. Or they can be working on a certificate, apply

for a job and get a job, complete the certificate and then sit for the exam.

This program will provide graduates of MSU-Northern's Civil Engineering Technology Bachelor of Science degree program, Plumbing Technology Associate of Applied Science Technology program, and Water Quality Associate of Applied Science Technology Program more avenues of employment. By completing one of the four certificates in the water quality program not only will they be earning a departmental certificate from MSU-Northern but by completing the required Backflow Prevention Assembly Testers core course they will be nationally certified as a backflow prevention assembly tester and by sitting for a state of Montana operator certification exam they will be certified by the state of Montana as an Operator-In-Training as either a Water Operator, Wastewater Operator, Water Distribution Operator, Industrial Wastewater Operator or On-site Wastewater Operator.

Other constituencies (water and wastewater operators, sanitarians, engineers, plumbers, and industry representatives) already utilizing the Montana Environmental Training Center's programs that may benefit from the certificate program are those water and wastewater operators already working in municipalities and other systems who would like to further their education and would see these certificate programs as a way to do so by being able to take online courses and get college credit for taking some of METC's courses.

C. What is the anticipated demand for the program? How was this determined?

Anticipated demand for this program is high if as courses as possible are offered as online courses by MSU-Northern and short three to five day courses by METC. This format is highly desirable for those already working in the industry and for those that are place bound across the state wishing to get into the industry. In addition, some of Montana's larger municipalities are voicing interest in this program format to the METC Interim Director as a possible method for personnel training. In 2009 the Interim Director also had a list of 126 potential students whom could still possibly be potential students.

Demand for the MSU-Northern's AAS Water Quality Technology program first surfaced in 2009 1) when the Montana Environmental Training Center began conducting surveys for the need of the program to return and 2) when then MSU-Northern Provost Joe Callahan began receiving letters from those in the water and wastewater industry including municipalities large and small, state agencies, engineering firms and even the Environmental Protection Agency. This prompted the Provost to encourage the Board of Regents to lift the moratorium. Since this time the Montana Department of Environmental Quality (DEQ) has noted an increase in the lack of trained operators for systems in Montana. In addition, the US EPA has identified the water and wastewater industry as an area for returning military veterans to find employment.

In March of 2009 the DEQ's Water and Wastewater Operator Certification program provided METC the following data: 224 (14%) active operators in Montana were 62 years of age or older. And, another 82 active operators were between the ages of 60 and 62 (5.1%). Thus, 19.1% of the 1,602 certified water and wastewater operators in Montana in 2009 were over the age of 60 and closing in on retirement.

The January/February 2011 edition of Water Efficiency stated that "In a study done by the American Water Works Association (AWWA) and the Water Environment Federation (WEF) the highest level of need for non-administrative employees was in the area of certified plant operators in both drinking and wastewater plants." AWWA also identified in its 2010 State of the Industry report workforce issues as one of the top five topics of concern. This problem has been increasing in intensity since

Montana Board of Regents
CURRICULUM PROPOSALS

AWWA first brought its concern to the attention of the industry in 2005. It is now estimated that 40% of the workforce will retire in the next 10 years.

Every public community, which is defined as 15 hook-ups or having a population of 25 full-time residents, requires a certified water treatment operator and wastewater treatment operator to monitor, report data, operate and maintain its water and wastewater treatment systems. The demand for students from the water quality program has increased by at least 100 percent. Salaries for water quality technicians range from $20,000 up to $50,000 per year.

4. Institutional and System Fit

A. What is the connection between the proposed program and existing programs at the institution?

Currently, MSU-Northern is the only institution in Montana that provides an AAS degree for students seeking employment as water and wastewater operators. Most of the core courses for the proposed program are courses that are part of MSU-Northern's AAS Water Quality Technology degree or METC's recertifying programs.

B. Will approval of the proposed program require changes to any existing programs at the institution? If so, please describe.

It will add some courses to the curriculum and require that METC attached assignments and a grading system to those courses which become a part of the certificate program.

C. Describe what differentiates this program from other, closely related programs at the institution (if appropriate).

Not appropriate, no closely related programs at MSU-Northern.

D. How does the proposed program serve to advance the strategic goals of the institution?

The proposed program serves to provide education that can be used directly and immediately in the water and wastewater industry. Completion of the program prepares students to sit for the state certification exams. This is a tenant of the mission of MSU-Northern.

E. Describe the relationship between the proposed program and any similar programs within the Montana University System. In cases of substantial duplication, explain the need for the proposed program at an additional institution. Describe any efforts that were made to collaborate with these similar programs; and if no efforts were made, explain why. If articulation or transfer agreements have been developed for the substantially duplicated programs, please include the agreement(s) as part of the documentation.

No other similar programs exist within the Montana University System.

5. Program Details

A. Provide a detailed description of the proposed curriculum. Where possible, present the information in the form intended to appear in the catalog or other publications. NOTE: In the case of two-year degree programs and certificates of applied science, the curriculum should

Montana Board of Regents
CURRICULUM PROPOSALS

include enough detail to determine if the characteristics set out in Regents' Policy 301.12 have been met.

B. Describe the planned implementation of the proposed program, including estimates of numbers of students at each stage.

6. Resources

A. Will additional faculty resources be required to implement this program? If yes, please describe the need and indicate the plan for meeting this need.

Most likely not as the plan is to use the current faculty to teach Northern's courses and to use METC's staff and instructors to teach the METC courses.

B. Are other additional resources required to ensure the success of the proposed program? If yes, please describe the need and indicate the plan for meeting this need.

No.

7. Assessment

How will the success of the program be measured?

In four ways.

1) By enrollment in the certificate programs and graduates from the certificate programs.
2) By increased enrollment in the AAS program and graduates from the AAS program.
3) By increased number of certified water and wastewater operators in Montana.
4) By graduates employed as operators and technicians in-state and out-of-state.

8. Process Leading to Submission

Describe the process of developing and approving the proposed program. Indicate, where appropriate, involvement by faculty, students, community members, potential employers, accrediting agencies, etc.

MSU-Northern's Faculty will approve the program. MSU-Northern students in the BS Civil Engineering, AAS Plumbing and AAS Water Quality Technology degree programs will review and provide input as to the value of the certificate program to students. An advisory committee will be made of up managers and operators as well as other professionals in the field. The committee will advise MSU-Northern on the curriculum content and make suggestions on how to deliver the certificate programs from a distance and possible on-site workshops.

MSU-Northern
Water Quality Program
Operator Survey
Spring 2009

Profession (2)			
Water Operator	WW Operator	Plumber	City Official
83	49	6	5
Well Driller	Industrial Op.	Engineer	Other
		2	18

Time in Profession (3)			
<10	10 -20	21 - 30	31 - 40
40	35	8	7

Degree Interest (6)			
Certificate	A.S.	B.S.	M.S.
24	32	13	10

Level of Education (4)		
8th Grade	High School	Vo-Tech
5	36	
College = 36		
A.S.	B.S.	M.S.
15	17	3

Course Method (7)				
Online	Teleconference	Classroom	Correspondence	3-5 Workshop
47	9	20	18	30

Area of Study Interest (5)			
Water Resources	WQ Operations	Lab Tech	Civil Engineering
19	41	3	15
Well Drilling	Hydrology	Plumbing	Sanitation
3	8	9	3
Ecology	Biology	Other	
4	1	3	

Travel Distance (8)			
<100	101-200	201-300	301-400
21	31	17	5

Begin Courses (10)	
Fall '09	Spring '10
22	33

Sponsor Employee (11)	
Yes = 20	
Full-Time	Part-Time
7	11
No	Uncertain
17	34

Time of Year (12)			
Winter	Spring	Summer	Fall
52	22	6	20

Type of Student (13)	
Part-Time	Full-Time
60	1

Need Financial Aid (14)	
Yes	No
46	9

Credit for Work Experience (15)	
Yes	No
62	7

MSU-Northern
Water Quality Program
Operator Survey
Spring 2009

Types of Courses of Interest to Operators (9)								
Basic Water Treatment	Basic Wastewater Treatment	System Design	Backflow Prevention	Operation & Maintenance	Electricity	Groundwater Treatment	Advanced Water Treatment	Small Water Systems
48	25	22	27	50	20	33	23	36
Hydrology	Basic Water Science	Stream/Lake Ecology	Individual WW Systems	SCADA/ Electronic Control Systems	Water Distribution	Wastewater Collection	Management	Laboratory
24	23	10	10	29	44	24	24	20
Pumps & Motors	Computer Systems	Advanced Wastewater Treatment	Lagoon System Operation	Rules & Regulations	Hydraulics	Stream/Lake Restoration	Industrial Treatment	Septic Systems
38	27	14	25	30	13	12	4	16

Results as of 5/13/09 60 Surveys 103 Surveys

MRWS Conference
Kalispell Spring School
Billings Spring School
MSAWWA/MWEA Conference
METC Workshops

COURSE REVISION FORM

NEW X DROPPED ____ MAJOR REVISION ____ FOR INFORMATION ONLY ____

College CEASN Program Area Water Quality Date ____

Submitter Carol A. Retzlaff Dean [signature] Date 11-30-12
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s):
This course is part of the proposed courses for the water quality certificate programs. It is designed to introduce health and safety techniques used in water and wastewater operations.

Please provide the following information:

College:	CEASN
Program Area:	Water Quality
Date:	10/30/12
Course Prefix & No.:	TSCI 1xx
Course Title:	Environmental Health & Safety for Water & Wastewater Personnel
Credits:	1 credit
Required by:	Water Quality – all certificates
Selective in:	
Elective in:	
General Education:	
Lecture:	XXX
Lecture/Lab:	
Gradable Lab:	
Contact hours lecture:	15 hours
Contact hours lab:	

Current Catalog Description (include all prerequisites):
There is no current description.

Proposed or <u>New Catalog Description</u> (include all prerequisites):
Provide students with fundamental knowledge of maintaining a safe, healthful work environment, as well as protecting the local community and environment from potential hazards generated by water and wastewater system activities.

Course Outcome Objectives:
Students who successfully complete this course will have gained the knowledge to protect themselves against (1) blood borne pathogens and (2) heat and cold stress as well as the importance of (1) personal protective equipment, (2) hearing protection, (3) respiration protection, (4) hazard communication, (5) laboratory safety, and (6) chemical security and spill cleanup. Students will also understand the components of lockout/tagout, permit required confined space and trenching, shoring and excavation safety programs.

Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

Possible demonstration by local utilities on lockout/tagout, confined space entry and trenching, shoring and excavation.

COURSE REVISION FORM

NEW X DROPPED ____ MAJOR REVISION ____ FOR INFORMATION ONLY ____

College CEASN Program Area Water Quality Date ____

Submitter Carol A. Reifschneider Dean [signature] Date 11-30-12
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s):
This course is part of the proposed courses for the water quality certificate programs. It is designed to introduce students to cross-connection control and backflow prevention and the testers that are used.

Please provide the following information:

College:	CEASN
Program Area:	Water Quality
Date:	10/27/12
Course Prefix & No.:	TSCI 2xx
Course Title:	Backflow Prevention
Credits:	3 credit
Required by:	Water Quality – wastewater collection & wastewater treatment certificates
Selective in:	
Elective in:	
General Education:	
Lecture:	
Lecture/Lab:	45 hours
Gradable Lab:	
Contact hours lecture:	30 hours
Contact hours lab:	15 hours

Current Catalog Description (include all prerequisites):
There is no current description.

Proposed or <u>New Catalog Description</u> (include all prerequisites):
Provide students with a basic knowledge of understanding of field testing methods on 4 valves; pressure vacuum breakers, spill resistant vacuum breakers, reduced pressure principle assemblies, and double check assemblies. Students will gain knowledge in hydraulics, backflow and backsiphonage, types of cross connections, and degrees of hazard and state and federal regulations. Completion of this course and the written and practical exams will result in certification by ABPA as a backflow prevention assembly tester.

Course Outcome Objectives:
Students who successfully complete this course will:
1) Understand the field testing methods on 4 valves;
2) Have basic knowledge about federal, state and local backflow regulations;
3) Have hands on experience with backflow testing assemblies;
4) Be familiar with connections, special application devices, and unapproved devices;
5) Understand the importance of cross-connection control and backflow prevention;
6) Be familiar with the maintenance and repair of devices.

Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

COURSE REVISION FORM

NEW _X_ DROPPED ____ MAJOR REVISION ____ FOR INFORMATION ONLY ____

College _CEASN_ Program Area _Water Quality_ Date ____

Submitter Carol A. Repfirner Dean [signature] Date 11-30-12
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s):
This course is part of the proposed courses for the water quality certificate programs. It is designed to introduce students to current topics of importance to the field of water and wastewater.

Please provide the following information:

College:	CEASN
Program Area:	Water Quality
Date:	10/22/12
Course Prefix & No.:	TSCI 2xx
Course Title:	Water and Wastewater Schools
Credits:	2 credit
Required by:	Water Quality – wastewater collection & wastewater treatment certificates
Selective in:	
Elective in:	
General Education:	
Lecture:	30 hours
Lecture/Lab:	
Gradable Lab:	
Contact hours lecture:	30 hours
Contact hours lab:	

Current Catalog Description (include all prerequisites):
There is no current description.

Proposed or <u>New Catalog Description</u> (include all prerequisites):
This course will introduce students to current topics of importance to the field of water and wastewater operations in addition to having the opportunity to review material in preparation for taking the State of Montana Certification examinations.

Course Outcome Objectives:
Students who successfully complete this course will:
1) Understand the current topics in the field of water and wastewater;
2) Have basic knowledge about federal, state and local wastewater regulations;
3) Review topics required for successful completion of the state certification exams;
4) Be familiar with state and federal regulations that govern water and wastewater; and
5) Have basic knowledge of collection systems, distribution systems, treatment system utilized in the water and wastewater profession.

Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

COURSE REVISION FORM

NEW __X__ DROPPED ____ MAJOR REVISION ____ FOR INFORMATION ONLY ____

College __CEASN__ Program Area __Water Quality__ Date ______

Submitter Carol A. Rephren (Signature) Dean [signature] Date 11-30-12
Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s):
This course is part of the proposed courses for the water quality certificate programs. It is designed to introduce students to industrial wastewater systems commonly used in Montana.

Please provide the following information:

College:	CEASN
Program Area:	Water Quality
Date:	10/30/12
Course Prefix & No.:	TSCI 1xx
Course Title:	Industrial Wastewater Systems
Credits:	1 credit
Required by:	Water Quality – wastewater treatment certificate
Selective in:	
Elective in:	
General Education:	
Lecture:	XXX
Lecture/Lab:	
Gradable Lab:	
Contact hours lecture:	15 hours
Contact hours lab:	

Current Catalog Description (include all prerequisites):
There is no current description.

Proposed or <u>New Catalog Description</u> (include all prerequisites):
Provide students with fundamental knowledge of (1) the types of industries, including but not limited to dairy, paper, mining, oil and coal, that produce and must treat wastewater in Montana; (2) the methods used for treating industrial wastewater; (3) the common issues related to most industrial wastewaters will including chemicals, pH, BOD, COD, solids and others; (4) pretreatment of industrial wastewater prior to discharge to a municipal wastewater treatment system; (5) rules and regulations related to treatment and discharge of industrial wastewater; and (6) the Montana Department of Environmental Quality's operator certification requirements and exam process.

Course Outcome Objectives:
Students who successfully complete this course will: (1) have a general understanding of the sources of industrial wastewater and the associated system processes; (2) understand what is required to become a certified industrial wastewater operator; (3) gain an understanding of the MPDES permitting and other rules and regulations related to discharging treated industrial wastewater including TMDLs; (4) understand biological, chemical and physical treatment processes used for industrial wastewater; and (5) solids removal and disposal.

Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

Tour of a local industrial facility.

COURSE REVISION FORM

NEW X DROPPED ____ MAJOR REVISION ____ FOR INFORMATION ONLY ____

College CEASN Program Area Water Quality Date ____

Submitter Carol A. Pertzborn Dean [signature] Date 11-30-12
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s):
This course is part of the proposed courses for the water quality certificate programs. It is designed to introduce students to on-site wastewater systems and how they are commonly used in small municipalities to treat wastewater.

Please provide the following information:

College:	CEASN
Program Area:	Water Quality
Date:	10/26/12
Course Prefix & No.:	TSCI 1xx
Course Title:	On-Site Wastewater Systems
Credits:	1 credit
Required by:	Water Quality – wastewater treatment certificate
Selective in:	
Elective in:	
General Education:	
Lecture:	XXX
Lecture/Lab:	
Gradable Lab:	
Contact hours lecture:	15 hours
Contact hours lab:	

Current Catalog Description (include all prerequisites):
There is no current description.

Proposed or <u>New Catalog Description</u> (include all prerequisites):
Provide students with fundamental knowledge of (1) proven and experimental on-site wastewater treatment systems including septic tanks, grease tanks, aerobic treatment units, fixed activated sludge treatment, recirculating sand filter, trickling filter, mound system, subsurface drip system, and peat fields. (2) site evaluations and design considerations; (3) on-site sewage disposal laws, regulations and permitting procedures; (4) inspections and complaint investigations; (5) unacceptable systems; (6) operation and maintenance; (7) public health and environmental considerations; and (8) public relations and public education.

Course Outcome Objectives:
Students who successfully complete this course will: (1) have a general understanding of the types and operation of on-site systems as well as installation considerations for on-site systems; (2) have a general knowledge of the maintenance of on-site systems and operation and management requirements; (3) gain an understanding of the importance of inspecting and permitting on-site systems; (4) understand Montana's current on-site operator certification requirements and testing procedures for publicly owned on-site systems as well as regulations and permitting procedures; and (5) be cognizant of public health and environmental issues related t using on-site systems.

Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

COURSE REVISION FORM

NEW X DROPPED ____ MAJOR REVISION ____ FOR INFORMATION ONLY ____

College CEASN Program Area Water Quality Date ____

Submitter Carol A. Rafferty Dean [signature] Date 11-30-12
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s):
This course is part of the proposed courses for the water quality certificate programs. It is designed to introduce students to wastewater lagoon systems which are commonly used in small municipalities to treat wastewater.

Please provide the following information:

College:	CEASN
Program Area:	Water Quality
Date:	10/22/12
Course Prefix & No.:	TSCI 1xx
Course Title:	Wastewater Lagoon Systems EPA CD
Credits:	1 credit
Required by:	Water Quality – water distribution certificate
Selective in:	
Elective in:	
General Education:	
Lecture:	XXX
Lecture/Lab:	
Gradable Lab:	
Contact hours lecture:	15 hours
Contact hours lab:	

Current Catalog Description (include all prerequisites):
There is no current description.

Proposed or <u>New Catalog Description</u> (include all prerequisites):
Provide students with a basic knowledge of wastewater lagoon systems including: (1) the origins of wastewater lagoon treatment; (2) what constitutes wastewater; (3) management of a system; (4) rules and regulations governing operation of a system as well asl sampling, testing and monitoring; (5) wastewater collection systems and lagoon structure; (6) the biological, chemical and natural physical treatment processes that occur in a system; (7) different types of lagoon systems, discharge options, disinfection choices, sludge removal options, and safety and security concerns and how all these issues pertain to operation and maintenance; (8) collecting wastewater lagoon samples for testing as well as the importance of monitoring influent and effluent flows and sludge accumulation; (9) basic information about common wastewater problems and offer guidance in identifying causes and solutions; and (10) math calculations common to wastewater treatment.

Course Outcome Objectives:

Students who successfully complete this course will:

1) Understand the characteristics and constituents of wastewater;
2) Have basic knowledge about federal, state and local wastewater regulations;
3) Recognize collection system and wastewater lagoon structure components;
4) Be familiar with wastewater influent and effluent flows and loads and sludge levels;
5) Understand the importance of cross-connection control and backflow prevention;
6) Understand the biological, chemical and natural physical treatment processes that occur in a wastewater lagoon system;
7) Recognize the importance microorganisms play in the treatment process;
8) Comprehend the basic operations of a wastewater lagoon system;
9) Be familiar with the proper maintenance required for a lagoon system;
10) Recognize the importance of facility security and safety as related to operation and maintenance;
11) Understand the importance of influent and effluent sample site locations, the types of samples that are collected and their purposes; and proper sample containers and how to label them;
12) Be familiar with wastewater lagoon problems, how to recognize the associated causes, and how to determine solutions to the problems; and
13) Be able to calculate math problems related to BOD, volume, area flow, dosage, pumping, detention time, loading, and TSS removal.

Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

Computer to run training CD. Must have Windows XP or later.

COURSE REVISION FORM

NEW X DROPPED ____ MAJOR REVISION ____ FOR INFORMATION ONLY ____

College CEASN Program Area Water Quality Date ____

Submitter Carol A. Perkins Dean [signature] Date 11-30-12
Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s):
This course is part of the proposed courses for the water quality certificate programs. It is designed to introduce students to the types of pumps and motors commonly used in municipal water and wastewater systems.

Please provide the following information:

College:	CEASN
Program Area:	Water Quality
Date:	10/22/12
Course Prefix & No.:	TSCI 1xx
Course Title:	Pumps and Motors Operation and Maintenance
Credits:	1 credit
Required by:	Water Quality – water distribution certificate
Selective in:	
Elective in:	
General Education:	
Lecture:	XXX
Lecture/Lab:	
Gradable Lab:	
Contact hours lecture:	15 hours
Contact hours lab:	

Current Catalog Description (include all prerequisites):
There is no current description.

Proposed or <u>New Catalog Description</u> (include all prerequisites):
Provide students with introductory concepts of pumps and motors used in the water and wastewater industry and general operation, maintenance and troubleshooting of each. Various types of pumps will be discussed including centrifugal, submersible, dose, screw and sludge pumps. Attention will also be given to hydraulic conditions and pump devices for the efficient use of pumps. Tours of the local water and wastewater systems will provide students the opportunity to see the pumps and motors in-line and operational.

Course Outcome Objectives:
Students who successfully complete this course will:

1) Have a general understanding of the operation and application of centrifugal, submersible, dose, screw and sludge pumps & their associated motors and the appropriate applications for each within water and wastewater systems.
2) Have a general knowledge of variable frequency drives, booster systems, mechanical seals and lift stations.
3) Gain an understanding of the importance of the proper installation and care of pumps and motors.

Additional instructional resources needed (including library materials, special equipment, and facilities). Please note: approval does not indicate support for new faculty or additional resources.

Water and wastewater treatment facilities for tours to view pumps and motors in-line and operating.

COURSE REVISION FORM

NEW _X_ DROPPED ____ MAJOR REVISION ____ FOR INFORMATION ONLY ____

College CEASN Program Area Water Quality Date ____

Submitter Carol A. Reifschneider Dean [signature] Date 11-30-12

Signature Signature (indicates "college" level approval)

Please provide a brief explanation & rationale for the proposed revision(s):
This course is part of the proposed courses for the water quality certificate programs. It is designed to introduce students to wastewater collection systems.

Please provide the following information:

College: CEASN
Program Area: Water Quality
Date: 10/30/12
Course Prefix & No.: TSCI 1xx

Course Title: Wastewater Collection Systems
Credits: 3 credit

Required by: Water Quality – wastewater collection certificate
Selective in:
Elective in:
General Education:
Lecture: XXX
Lecture/Lab:
Gradable Lab:
Contact hours lecture: 45 hours
Contact hours lab:

Current Catalog Description (include all prerequisites):
There is no current description.

Proposed or <u>New Catalog Description</u> (include all prerequisites):
Provide students with fundamental knowledge of (1) the importance and responsibilities of wastewater collection system operator; (2) the need for collection system operation and maintenance; (3) the components of and typical layouts of collection systems; (4) safety procedures for the construction, inspection and testing of sewers, inspection of manholes, and underground construction and repair; (5) rules and regulations related to treatment and discharge of wastewater; and (6) the Montana Department of Environmental Quality's operator certification requirements and exam process.

Course Outcome Objectives:
Students who successfully complete this course will: (1) have a general understanding of the need for wastewater collection systems, the construction, testing, inspection, operation and maintenance of these systems; (2) understand what is required to become a certified wastewater collection operator; (3) gain an understanding of the local ordinances in regard to wastewater discharges; (4) understand the safety procedures that must be followed during construction, inspection, testing, operating and maintaining wastewater collection systems; and (5) have a general understanding of the use of close-circuit television, clearing stoppages, cleaning sewers, and controlling roots, grease, odors and corrosion in collection systems.

Additional instructional resources needed (including library materials, special equipment,