DEC. 6, 2011 MEETING MINUTES

DIVISION OF NATURAL SCIENCES AND MATHEMATICS
WESTERN OREGON UNIVERSITY

December 6, 2011; NS122 4:00 PM NOTE: NO DIVISION MEETING IN JANUARY (still on break first Tuesday)

I. ROLL CALL / APPROVAL OF AGENDA

In attendance: Sarah Boomer, Mike LeMaster, Kristen Latham, Mike Baltzley, Breean Flesch, Mike Ciancetta, Matthew Nabity, Scott Beaver, Laurie Burton, Jeff Templeton, Rahim Kazerouni, Patty Flatt, Arlene Courtney, Steve Taylor, Niki Winslow.
Agenda was approved as written.

II. **APPROVAL OF NOVEMBER MINUTES** – approved as written.

III. ANNOUNCEMENTS

a. Sabbatical requests / proposals; (OUS "pink form" + CANCEL Supplement; to Div. Chair / Dean by 12/15/11)
b. Scheduling: Spring 2012 Corrections and Summer 2012 Summer Schedule Due to Niki December 19, 2011; 2012-2013 Academic Year Schedule Due to Niki January 3, 2011
c. Annual Reporting Process: Faculty Annual Reports Due to Dept.+Division Chairs June 30, 2012; Dept. Reports Due to Division Chair July 20, 2012; Division Report Due to Dean August 10, 2012
d. WOU Office of Admissions 2011-2012 Recruitment Dates: Winter Preview Day I Jan. 21, Winter Preview Day II Feb. 11, Spring Preview Day April 28, SOAR: June 22, July 13-14, July 28.
e. Chain of Communication: Faculty/Staff - Dept. Chair - Div. Chair –Dean-Provost –President
f. Faculty Development Grants: Research Jan. 27, 2012; Travel II and Reassignment April 9, 2012 (note: NEW! online submission process http://www.wou.edu/provost/ faculty_development.php). January requests will be for major research, with spring travel following date.
g. NSM Division Travel Supplement Deadlines: April 25, 2011 (following last year pattern)
h. Reminder: 2011-12 annual classroom observations of non-tenure track / tenure-track faculty
i. Niki / Office Coordinator announcements: the division budget is right on track.

IV. OLD BUSINESS

a. DeVolder Family Science Center status: 3-story building floor plan design in process.
b. Revised Drafts of LAS College Annual Assessment Reporting Forms: note - in draft form only at this time.

V. NEW BUSINESS

a. Environmental Chemistry Curriculum Proposal – see pages 10-13 of handout. Requires Bi 200 sequence, Probability and Statistics in mathematics.
b. SPOC Committee Process – LACC Lab Science Discussions: "Strategic Planning Operations Committee". Committee members: Gavin Keulks, Bob _____, Tad Shannon.
c. Provost Online Lab Science Feasibility Inquiry: see handout pgs. 14-22.

VI. **GUEST VISIT:** Dean Scheck – overview of SPOC Committee Process: Dean Scheck spoke to those attending this division meeting regarding SPOC. He said it is a "brain storming" group which is, among other things, discussing the feasibility of dropping 100-level science labs. He mentioned Provost Neely's message regarding increasing University enrollment or decreasing expenditures. President Weiss feels we need a decrease in spending in the 2013-2015 biennium in the neighborhood of three million dollars. SPOC will affect COE, LAS and other areas that report to the Provost. Some items on their list for discussion: what types of revenues are we talking about, what is the role of science/labs in general education, some schools can navigate without science. There is a proposed on-line discussion, ideas will go to the Provost, he will discuss with individuals. The SPOC is supposed to weed out really bad ideas. There should be opportunities to discuss pros/cons of ideas. They are looking at where we might enhance enrollments, present products. LAS comprises 70-75% of WOU enrollment. They are looking at how to condense enrollments, there won't be the luxury of under-enrolled courses. We may need to "retool" courses, get creative in what we offer. We will continue with 100-level courses next fall. After 2012 budgets get really tight. Mathematics may develop online courses, it is felt there may be a sizeable market for online courses in Alaska. The SPOC committee will continue meeting, their recommendations concern academics only. They may also consider Applied Baccalaureate degrees, modified two-year programs, certificates for the

Post-Baccalaureate market.

VII. **REPORTS**

a. NSM Budget Report – on target
b. Faculty Senate: had a short meeting, Bryan, Kristin, Mike LeMaster attending. Graduate students want a slot for interpretive studies.
c. Faculty Development Committee: requests were close to what was expected at this time.
d. AFT/WOU (workload committee):
e. Curriculum Committee: Biology has some small changes that they will send to Laurie and Steve.
f. Academic Requirements Committee: Policy is to include number of hours to petition for overload did not pass. The form has been upgraded. The "D" designation for transfer students will not require a signature. It will become automatic with the transfer. The "W" issue did not come up. The ARC is in the early phase of looking at the "D" criteria.
g. PRC / Tenure and Promotion (Files Due on Nov. 18): large stack of files from NSM in conference room, they will be reviewed after break.
h. Academic Infrastructure Committee No more funding at this time.
i. Building Committee (Div. + Dept. Chairs)
j. PURE/Academic Showcase**:** Bryan is wrapping up his PURE tenure this year. Ethan McMahan will take the helm next year. "Pure Insights" is the inaugural journal from the Showcase. Check with Camilla if interested, Ava for Biology.
k. Complaints

VIII. **FINAL COMMENTS AND ADJOURNMENT** ***(Happy Holidays and Winter Break)***

Steve mentioned that the "extra" form for sabbatical was removed.

Meeting was adjourned.

MEETING AGENDA
DIVISION OF NATURAL SCIENCES AND MATHEMATICS
WESTERN OREGON UNIVERSITY

December 6, 2011; NS122 4:00 PM *NOTE: NO DIVISION MEETING IN JANUARY (still on break first Tuesday)*

I. ROLL CALL / APPROVAL OF AGENDA p. 1

II. APPROVAL OF NOVEMBER MINUTES p. 2-3

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b. Scheduling: Spring 2012 Corrections and Summer 2012 Summer Schedule Due to Niki December 19, 2011; 2012-2013 Academic Year Schedule Due to Niki January 3, 2011
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g. NSM Division Travel Supplement Deadlines: April 25, 2011 (following last year pattern)
h. Reminder: 2011-12 annual classroom observations of non-tenure track / tenure-track faculty
i. Niki / Office Coordinator announcements

IV. OLD BUSINESS

a. DeVolder Family Science Center status: 3-story building floor plan design in process. p. 4
b. Revised Drafts of LAS College Annual Assessment Reporting Forms p. 5-9

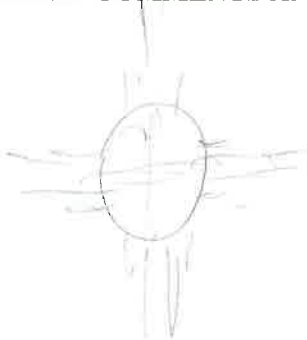
V. NEW BUSINESS

a. Environmental Chemistry Curriculum Proposal p. 10-13
b. SPOC Committee Process – LACC Lab Science Discussions
c. Provost Online Lab Science Feasibility Inquiry p. 14-22

VI. REPORTS

a. NSM Budget Report
b. Faculty Senate
c. Faculty Development Committee
d. Academic Infrastructure Committee
e. AFT/WOU (workload committee)
f. Curriculum Committee
g. Academic Requirements Committee
h. PRC / Tenure and Promotion (Files Due on Nov. 18)
i. Building Committee (Div. + Dept. Chairs)
j. PURE/Academic Showcase
k. Complaints

VII.* FINAL COMMENTS AND ADJOURNMENT *(Happy Holidays and Winter Break)



NOVEMBER 2011 MEETING MINUTES
DIVISION OF NATURAL SCIENCES AND MATHEMATICS
WESTERN OREGON UNIVERSITY

November 1, 2011; NS122 3:35 PM

I. ROLL CALL / APPROVAL OF AGENDA

In attendance: Sarah Boomer, Kristin Latham, Karen Haberman, Bryan Dutton, Jeff Myers, Jeff Templeton, Matt Ciancetta, Breeann Flesch, Patty Flatt, Arlene Courtney, Rahim Kazerouni, Don Ellingson, Julie Grammer, Scott Beaver, Hamid Behmard, Steve Taylor, Niki Winslow.
ARC discussion was moved to New Business as requested by Jeff Templeton. The Agenda was approved as amended.

II. **APPROVAL OF OCTOBER MINUTES.** Minutes were approved as written.

III. ANNOUNCEMENTS

a. Post-Tenure Review / Promotion and Tenure Files (Due: 3rd Friday in Nov. 11/18/11). It is suggested that new faculty talk with colleagues regarding file requirements.
b. Sabbatical requests / proposals; (OUS "pink form" + Provost Supplement to Div. Chair / Dean by 12/15/11). Scott felt that is not an instructor's responsibility to arrange for course coverage when they are on sabbatical. Bryan asked what is currently in the CBA regarding this. Scott said he thinks it leaves leeway to demand coverage as the responsibility of faculty.
c. Spring 2011 schedule revisions, summer 2011 schedule, 2011-12 schedule due to Niki early January 2012
d. Annual Reporting Process: Faculty Annual Reports Due to Dept.+Division Chairs June 30, 2012; Dept. Reports Due to Division Chair July 20, 2012; Division Report Due to Dean August 10, 2012
e. WOU Office of Admissions 2011-2012 Recruitment Dates: Fall Preview Day II Nov. 12, Winter Preview Day I Jan. 21, Winter Preview Day II Feb. 11, Spring Preview Day April 28, SOAR: June 22, July 13-14, July 28.
f. Chain of Communication: Faculty/Staff - Dept. Chair - Div. Chair –Dean-Provost –President
g. Department Infrastructure Plans Due to Division Chair Nov. 1 (today). There are not a lot of funds but we should have a plan of requests ready just in case there is an opportunity to request funding.
h. Faculty Development Grants: Travel I Friday, November 4; Research Jan. 27, 2012; Travel II and Reassignment April 9, 2012 (note: NEW! online submission process http://www.wou.edu/provost/faculty_development.php)
i. NSM Division Travel Supplement Deadlines: Nov. 22, 2011 and April 25, 2011 (following last year pattern). Jeff Templeton will send out travel request forms.
j. AIC Equipment and Low-Cost Remodel Proposals Due Nov. 11, 2011. Basically, there is no funding. Tricia signs off on computer hardware purchases; Tom Neal and Tricia on rooms; Erin should ask Gay Timkin where the upgrade of NS 123 fits into an overall plan.
i. Niki / Office Coordinator announcements: no announcements.

IV. OLD BUSINESS

a. NS201 Remodel / Technology Upgrade – complete; NS114 Smart-lab installation in progress.
b. DeVolder Family Science Center status: $2.3 M funds secured for bricks and scholarships, ~$1M more needed from grants and gifts; Soderstrom Architects selected, preliminary phase 1 "block model" design in progress; detailed phase 2 design (what will be in labs) will start before winter break with much work in first half of winter term; solicitation of bids / construction companies in progress. There is no real funding for any revision of the old NS spaces that will be vacated.
c. Applied Baccalaureate programs revisited. Basically this is where two year community colleges and technical degrees turn into a LACC modified degree equaling, for example, an AB in Bio Tech.

V. NEW BUSINESS

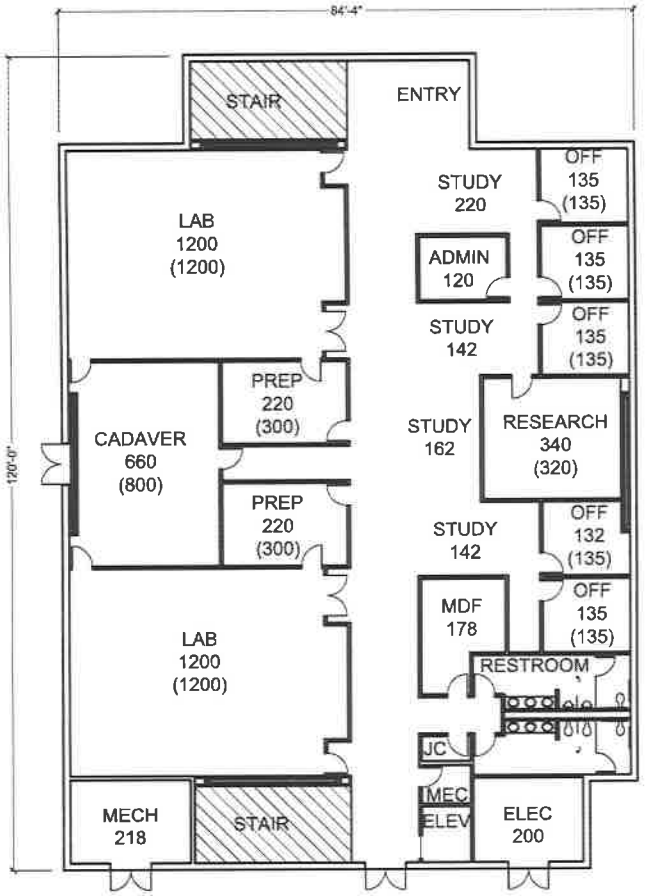
a. NS Building Security / Custodial Relations: emails have been sent out regarding rooms being left open and chairs and waste baskets left of counters with equipment. We have communicated with custodial and security, hopefully the issues will soon be taken care of.
b. See the Provost's email, page 6 of handouts regarding online lab science courses. This would be considered as a cost-saving measure, saving faculty fte. Sarah does not support. Steve said it would be helpful to have a memo from the Provost stating what the goal is.
c. ARC – Jeff provided a 3-page handout regarding the petition to amend overload policy which would raise the number of undergraduate credits which require an Overload Petition from 19 to 21. The proposal would change the current overload form. The process is just in the data collection and analysis phase. Students would pay for the extra credits. The advisor would be the gate-keeper in regards to approving students for overload. Karen Haberman stated she prefers a 19 credit limit, Bryan Dutton is not in favor of changing to 21 credits. Don Ellingson feels students are too busy for 21 credits, Laurie Burton said as an advisor she would speak with any students considering 19+ credits individually. A vote was taken, no one was in favor or changing to a 21 credit limit, 10 were opposed, a few abstained.

VI. REPORTS

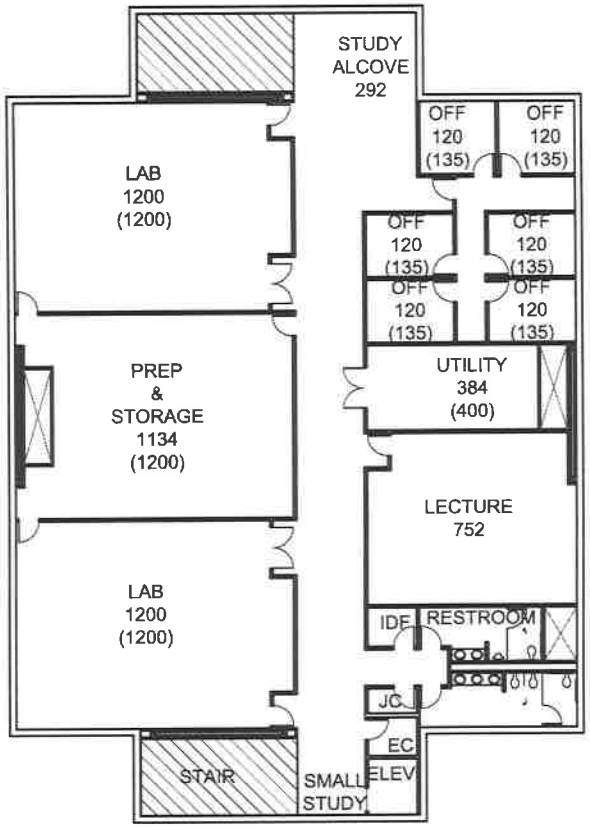
a. NSM Budget Report (Budgets Finalized for 2011-12) See page 7 of Agenda.
b. Faculty Senate – Mark Weiss was present for meeting; Provost Neely shared a presentation.
c. Faculty Development Committee – Friday is the deadline for submitting first requests in categories 1 & 2, all submissions are online.
d. Academic Infrastructure Committee – did not meet.
e. AFT/WOU (workload committee) – Workload committee tried to make the time spent in lab equivalent to time spent in lecture. The committee is going forward regarding fte for setting up labs. Jeff Myers, Bryan and Scott are our committee members. Bryan recommended bringing forth any unresolved issues. The question is: are we good with the status quo or do we want everything a 1:1 ratio?
f. Curriculum Committee- Chemistry has an environmental program pending. Biology has made very slight changes.
g. ARC
h. PRC / Tenure and Promotion files are due on November 18, 2011 in the Division office.
i. PURE/ Academic Showcase: May 31, 2012.
j. Building Committee (Div. + Dept. Chairs)
k. Complaints – none.
l. Math – prerequisite approval Process

Meeting adjourned 4:55 pm

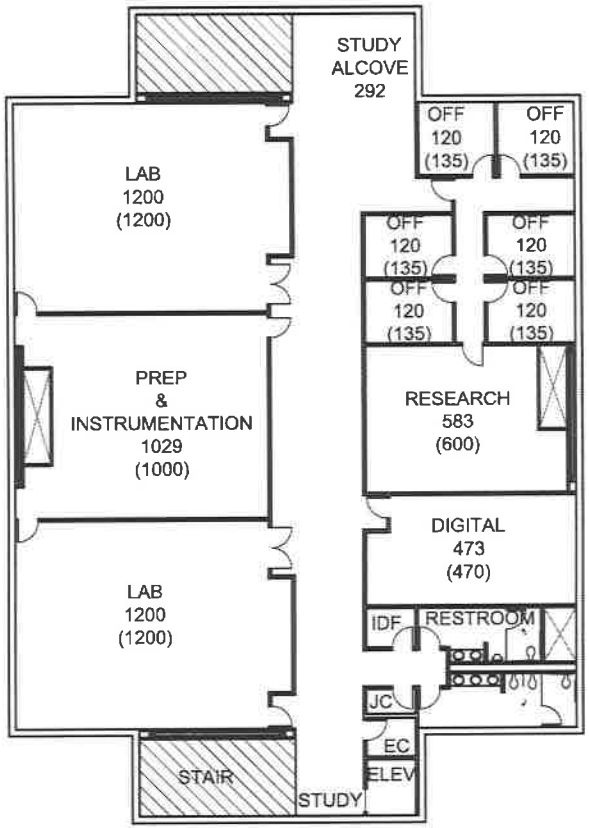
VII. FINAL COMMENTS AND ADJOURNMENT



FIRST FLOOR TOTAL 9,491



SECOND FLOOR TOTAL 9,045



THIRD FLOOR TOTAL 9,045

SCHEMATIC FLOOR PLAN - Redevelopment Option 2A - NO LECTURE ROOM ON 1ST FLOOR

DeVolder Family Science Center

WESTERN OREGON UNIVERSITY

DECEMBER 2, 2011

SODERSTROM ARCHITECTS

College of Liberal Arts and Sciences

Archival Summary Report: Departmental Learning Outcomes Assessment

(To be completed and forwarded, electronically, to division office.)

Department: _____ Division: _____

Department contact: _____ Date: _____

1. Program, major/minor or curriculum components reviewed—indicate which learning outcome(s) these components service:

2. Assessment methods (type of data reviewed):

3. Actions to be taken by the department:

4. Expected enhancement to departmental programming or support to other academic units:

5. Plan for follow-up actions or tracking

Departmental Assessment Plan: Student Learning Outcomes

(Please submit, electronically, to division office.)

Program Information	
Academic Program (Major)	
Degree	
Department	
Division	
Academic Year	
Departmental Contact Person	
Name	*This should be person coordinating the program's assessment effort*
Title	
Department	
E-Mail Address	
Extension	
Program Mission Statement and Learning Outcomes	
Insert the program mission statement as published in the most recent academic catalog.	

Program Learning Outcome Assessment	
Learning Outcomes published in the most recent academic catalog.	Outcome 1
	Outcome 2
	Outcome 3
Target	*Describe what level of proficiency or percent student attainment of the stated learning outcome.*
Data Source	*Describe where and when data will be collected, how and if students will be sampled, and estimated sample size.*
Means of Assessment	*Describe in detail the method of assessment you will be using (e.g., capstone project, course-embedded assessment, standardized instrument, etc.).*
Means of Scoring	*Describe how you will score the assessment. For example, will you use a rubric or answer key, or will it be scored by a testing company? (If you plan to use a rubric, be sure to include the rubric as an appendix.) Who will do the scoring? One or more people? How will scores be reported (e.g., total scales or subscores)?*

Evidence Storage	*Describe how/where the evidence pertaining to the assessment process is being archived. Electronic archive is preferred when possible. Please be certain that records can be retrieved for review by internal (e.g., division, college, university) or external (e.g., NWCCU) reviewers.*

Program Learning Outcome Assessment		
Learning Outcomes published in the most recent academic catalog.	Outcome 1	
	Outcome 2	
	Outcome 3	
Target	*Describe what level of proficiency or percent student attainment of the stated learning outcome.*	
Data Source	*Describe where and when data will be collected, how and if students will be sampled, and estimated sample size.*	
Means of Assessment	*Describe in detail the method of assessment you will be using (e.g., capstone project, course-embedded assessment, standardized instrument, etc.).*	
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Program Learning Outcome Assessment	
Learning Outcomes published in the most recent academic catalog.	Outcome 1
	Outcome 2
	Outcome 3
Target	*Describe what level of proficiency or percent student attainment of the stated learning outcome.*
Data Source	*Describe where and when data will be collected, how and if students will be sampled, and estimated sample size.*
Means of Assessment	*Describe in detail the method of assessment you will be using (e.g., capstone project, course-embedded assessment, standardized instrument, etc.).*
Means of Scoring	*Describe how you will score the assessment. For example, will you use a rubric or answer key, or will it be scored by a testing company? (If you plan to use a rubric, be sure to include the rubric as an appendix.) Who will do the scoring? One or more people? How will scores be reported (e.g., total scales or subscores)?*

Evidence Storage	*Describe how/where the evidence pertaining to the assessment process is being archived. Electronic archive is preferred when possible. Please be certain that records can be retrieved for review by internal (e.g., division, college, university) or external (e.g., NWCCU) reviewers.*

This is a draft copy of a proposed curriculum addition within the Department of Chemistry. This proposal adds a new option to the chemistry major in environmental chemistry. As with our current forensic and medicinal chemistry programs, the major is somewhat interdisciplinary in major. The major requires the a biology sequence, physics sequence, and a series of mathematics courses in addition to the chemistry core. The major has a coupled required minor which contains a significant earth science component including at least one course in Geographic Information Systems. This program was developed to provide an alternative for science students to a traditional chemistry curriculum combined with the Environmental Studies minor since that combination does not provide our students with an adequate exposure to either biology or earth science which are important in understanding environmental issues. We welcome input from our colleagues within the division.

would give them a much broader understanding of the scientific components of environmental issues. Although there is an Environmental Studies minor available to students on campus, it does not provide the scientific background needed by students seeking scientific careers in environmental areas.

It is difficult to predict the actual number of students who would choose to pursue this option. However, the popularity of our subject-focused Forensic Chemistry and Medicinal Chemistry/Pharmacology options give us reason to believe that this proposed program would attract students to Western. We attract students to our campus into the Forensic Chemistry option who otherwise might not choose Western as their college of choice because of its uniqueness. Western graduates 5-7 students with chemistry degrees per year split between the traditional and Forensic Chemistry options. The Medicinal Chemistry/Pharmacology option will not generate its first graduates until next year. An environmental option will benefit the division as a whole because it will increase the number of students enrolled in other areas of science and mathematics due to the requirement of coursework in mathematics, biology and geology in addition to chemistry.

Give the proposed catalog description:

Chemistry Major: Environmental Chemistry Option

Ch 221, 222, 223 General Chemistry (15)
Ch 312 Quantitative Analysis (4)
Ch 313W Instrumental Analysis (4)
Ch 334, 335, 336 Organic Chemistry (9)
Ch 337 Organic Chemistry Lab I (1)
Ch 338 Organic Chemistry Lab II (2)
Ch 340 Elementary Physical Chemistry (4)
Ch 350W Chemical Literature (1)
Ch 371 Environmental Chemistry (3)
Ch 407W Seminar (1)
*Ch 412 Inorganic Chemistry of the Environment (4) – formerly Advanced Inorganic Chemistry (3)
Ch 461W, 462W Experimental Chemistry (4)
Ch 450 Biochemistry (3)
BI 211, 212, 213 Principles of Biology (15)
MTH 243 Introduction to Probability and Statistics (4)

Total hours = 74

*requires name change and change hours from 3 to 4

The B.A. requires MTH 252, CS 121 or 161 and completion of the third term of the second year of a modern language. The B.S. requires a combined 12 credit hours of coursework in mathematics and computer science including MTH 252 and CS 121 or 161. For this major the

Text template for curriculum proposals
This template can not be used to submit proposals
See http://www.wou.edu/president/facultysenate/curriculum/ for online instructions

New Minor

Program level:

X Undergraduate program ____ Graduate program

Program Title: Chemistry

New Minor Title: Environmental Sciences Minor

Please fill out each field. An option to attach additional documentation such as a new minor plan is available after you hit the submit button.

Catalog Description of Minor:

Environmental Sciences Minor:

*CH 310 Environmental Geochemistry (3) – formerly Geochemistry
CH 361 Energy and Resources in Perspective (3)
ES 201, 202 Principles of Geology (8)
ES 473 Environmental Geology (4)

One Course from the following:
ES 341 Fundamentals of Geographic Information Systems (4)
GEOG 341 Geographic Information Systems (4)
ES 492 GIS Applications in Earth Science (3)

Electives: Choose 6-7 hr from the following list:
BI 357 General Ecology (4)
BI 331 General Microbiology (4)
BI 361 Marine Ecology (5)
CH 161 Fundamentals of Photography for Forensic Science (1)
CH 345 Introduction to Toxicology (3)
CH 360 Nuclear Chemistry (3)
CH 401 Research (1-3)
CH 409 Practicum (1)
ES 331 Introduction to Oceanography (3)
ES 460 Energy and Mineral Resources (3)

Text template for curriculum proposals
This template can not be used to submit proposals
See http://www.wou.edu/president/facultysenate/curriculum/ for online instructions

ES 476 Hydrology (3)
ES 492 GIS Applications in Earth Science (3)
GEOG 393 Soils Geography (4)

Total hours = 27 to 29

*requires name change

This minor is available to non-chemistry majors. If an Earth Science major selects this minor, ES 201, 202 and 473 will be replaced with Ch 223, Ch 371 and one additional science course approved by an advisor. If a Biology major chooses this minor, Ch 371 will be a required elective.

Justification for adding the minor

In order for a Chemistry major to be well prepared for an environmentally-focused career, they should have exposure to fundamental geological principles. Through the required coursework, this minor provides foundation in the area of geology along with exposure to the techniques of Geographic Information Systems that are increasingly employed in studies of environmental ecosystems. Through elective offerings, students can choose to broaden their focus to include coursework in ecology, study more advanced geologic or chemical topics or participate in an environmentally-focused research project. This minor would also service students who are not majoring in chemistry but can meet the prerequisite requirements for courses within the program.

Western Oregon UNIVERSITY powered by Google

Steve Taylor <taylors@mail.wou.edu>

NSM Action Needed by Dec. 6: Provost Inquiry Regarding Development of Web Based Lab Science Courses

1 message

Steve Taylor <taylors@wou.edu> **Mon, Nov 21, 2011 at 6:03 PM**
To: Jeff Templeton <templej@wou.edu>, Sarah Boomer <boomers@wou.edu>, Schoenfeld William <schoenfeldw@wou.edu>, Arlene Courtney <courtna@wou.edu>, Arlene Courtney <courtna10@aol.com>
Cc: schecks@wou.edu

Colleagues - I have received two separate, but related email inquiries from the Provost this fall soliciting my opinions on the viability of offering web-based, virtual lab science courses as a potential efficiency / cost-saving measure. I have pasted the two email inquiries below for your reference.

(1) The first involves curriculum promoted by the North American Network of Science Labs Online (NANSLO) | Western Interstate Commission for Higher Education

http://www.wiche.edu/nanslo

(2) The second involves review of web-based courses offered by BC Campus in Canada:

http://rwsl.nic.bc.ca/

They have been developing web curriculum in biology, chemistry, physics, and geology.

In terms of my own experience, I have not personally developed web-based lab-science curriculum, and my expertise is limited in scope to physical geology, environmental geology, hydrology, and surface processes. As such, to really be able to comment on this inquiry, I will need to solicit review and input from the respective department chairs and/or program leaders.

Let's please coordinate the response as a division, and send all comments/ideas back to the division chair for compilation. If you could review the email records below, and the above two web links, and provide comments as to the viability of web-based lab science at WOU as a cost-efficient delivery model, that would be greatly appreciated. Given that we are in week 9 of classes, before Thanksgiving Holiday, with week 10 and finals pending, if I could receive your comments, ideas, reviews by Tuesday Dec. 6, then I will compile before winter break and send to the Provost and Dean.

Thanks in advance for your time and effort in reviewing the potential for deployment of web-based science classes at WOU.

s.t.

14

---------- Forwarded message ----------
From: Kent Neely <neelyk@wou.edu>
Date: Mon, Oct 17, 2011 at 8:57 AM
Subject: North American Network of Science Labs Online (NANSLO) | Western Interstate Commission for Higher Education
To: Steve Scheck <schecks@wou.edu>, Steve Taylor <taylors@wou.edu>, JoNan LeRoy <leroyj@wou.edu>

Good morning folks - I got this info from the OUS Chancellor's Office - I think it's worth checking out as a possible means of offering lower level courses in a more cost efficient manner - please let me know what you think,
Kent

http://www.wiche.edu/nanslo

Kent Neely neelyk@wou.edu

4:23 PM (1 hour ago)

to Steve, Steve, JoNan
Steve:

JoNan recently attended a national conference regarding distance eduation. She met Paul Stacy, Director - Communications, Stakeholder & Academic Relations from BCcampus. The following is from their website:

"We work to bring the best in educational technology and distance learning to BC's public post-secondary institutes, and their students, faculty and administrators. We are here to connect, collaborate and innovate - connecting institutions and educators with learners around the province. By connecting institutions and educators, we are fostering a climate of collaboration where innovative new educational technologies and opportunities can thrive."

"Our ultimate goal is to help BC's public post-secondary institutions create a unified system where information and student data, curriculum, courses, and programs flow freely and securely between institutions."

JoNan said that Mr. Stacey has information about virtual chemistry lab educational experiences. I wanted to ask you to review it (see http://rwsl.nic.bc.ca) and tell Dean Scheck and me whether it has virtues that warrant our review as a possibility for Western. In this time of strained economic resources, I want to look at a variety of ways to deliver a quality educational experience that may be more economical. Thanks,

Kent

Taylor Response to Provost Dec. 5, 2011
RE: Feasibility of WOU Online Lab Science as a Cost Reduction Strategy

Note sent on Nov. 21, 2011

Provost Neely:

This memo is written in reference to your inquiry regarding opinions on the viability of offering online, web-based lab science at WOU as a "cost efficiency" or cost saving measure. In addition to my own personal perspectives (drafted below), I have also asked the respective science department chairs in the NSM Division for feedback on this concept. Their respective responses are attached.

As part of my assessment process, I've taken a scan of the web link you sent for the BC campus web-science model, and for the the North American Network of Science Labs Online (NANSLO) program. It looks like BC Campus web science program was a funded as a curriculum development project dating back to 2009, with programming in web-based curriculum for Physics, Biology, Geology, Chemistry. I have limited direct experience in web-based lab science, however I extensively use web resources in my particular lower and upper division Earth Science courses at WOU, including hybrid use of Moodle for select homework exercises.

I do not have any direct experience in the development or delivery of authentic, inquiry-based lab-science courses in a web based environment. In addition, my direct expertise is in the geosciences discipline, specifically surface processes, geomorphology, hydrology, environmental geology, and geographic information systems. Given the scope of the disciplines represented on the BC campus web site, and the number of science departments/programs represented in our division (biology, chemistry, physics, geology/Earth Science), I will need to circulate this to the department chairs/program leaders for comment and review as to the viability with respect to Western Oregon University. Web-based delivery of lab science is an interesting piece, not sure how applicable it is for our situation. This concept would require some pilot testing.

In terms of my own experience / opinions on the topic of web-based lab science, I'll refer back to my previous email comments on this topic from about a month ago (see pasted bullets below for my opinions/knowledge base on this topic). In the mean time, I will send your inquiry and related web links to the respective NSM department chairs/program leaders for comment and review on possibilities. Given that we are at week 9, right before Thanksgiving break, I'll request that they provide feedback by Tuesday Dec. 6, the date of our next division meeting. I will gather the comments and send a compilation shortly thereafter.

Please let me know if the above strategy will be helpful. Thanks for the information, I will solicit feedback from the faculty troops, and compile responses before winter break (see attached).

Here are some off-the-cuff, first-cut ideas on what I know about the topic of web-based lab science curriculum at WOU:

(1) I am not directly familiar with online lab-science curriculum, nor do I know of any faculty colleagues in WOU who have engaged this. I will circulate a request for comment and review.

(2) WOU currently does not have any web -based lab science on line; nor do we have science faculty who have actively engaged web-based courses in any significant way. We do have faculty that provide "hybrid" courses, ~85-90% in-class with ~10-15% service provided by Moodle support.

(3) We (select division faculty) have had discussions in the past about the fact that Chemeketa Community College offers some on-line laboratory science courses, and we have had WOU students engaging those courses and attempting to transfer the credits to WOU as part of their science degrees.

(4) The past discussions of students engaging online lab science at Chemeketa (item 5 above) received very negative feedback from division faculty, and the student preparation resulting from those transfer courses did not appear to provide sufficient depth of knowledge or skills. Based on very qualitative, ad hoc hallway discussions, a significant number of faculty were not in favor of this approach in the past and believe that lab and field science are best offered in physical spaces/environments. However, we have added/replaced a number of TTT faculty in our division over the past 4 years, it's a changing landscape with next generation colleagues, I would have to conduct a systematic review to see what the present pulse is on this topic.

(5) I personally have way-back past experience teaching pre-internet distance science "tele-courses" with video content linked to a text book, and correspondence via U.S. postal service (early 1990's). These were not lab-based science courses, but topical gen. ed. textbook-video applications, not inquiry or laboratory based.

(6) I personally have some loose ideas about offering some type of online science course at WOU, but these would be designed for a summer offerings, at the upper division level, reading-based courses linked to some type of multi-day field trip. I have not been thinking about an actual online lab-science curriculum.

(7) The other person in NSM Division who has been thinking about online science is Arlene Courtney in Chemistry. She has been developing extensive web-based resources and videography over the years. Again based on informal collegial discussions, I know Arlene has been thinking about the possibility of offering an introductory organic chemistry class online, but this would be more topical-lecture based, and not lab based. Arlene currently would be a lead, senior colleague who has been actively working on developing web-based science applications. To my knowledge, she has not been considering lab-based science at the 100- or 200-levels. Patty Flatt in Chemistry started offering online courses in toxicology, but these are not lab-based.

(8) I have informally discussed this idea with a couple colleagues over the years, and one significant barrier is the perception that we (WOU) do not have the level of web-based technology infrastructure, staffing, and support services at WOU that would lend itself to widespread online deployment of science classes. The above is a perception discussed by a couple colleagues, and not any type of data-based conclusion or documented condition. Pilot testing would be required to assess this situation.

(9) For the Division of Natural Sciences and Mathematics to seriously consider this idea in a systematic way, I would need to circulate a formal request to the three science departments (Chemistry, Biology, Earth&Physical Science), and we would need a month or so for everyone to review, brainstorm, consider, solicit group feedback.

(10) If we are to set up some type of systematic process for considering this idea (10 above), it would be most helpful for me to have a formal memorandum from either the Dean's or Provost's office asking the division to conduct a formal review of the topic, with some very explicit goals / action items / outcomes of the process. That would help me wrangle the herd, and get everyone paddling their boats in a meaningful direction.

(11) Based on your email inquiry below in the chain, it appears that you are thinking development of an online web-based lab-science curriculum at the 100- or 200-levels might be a possible way to offer LACC lab science in a more cost-efficient manner. Implicit in the concept is that by shifing lab science out of the classroom and into the web world, this would be a way to reduce expenses related to adjunct instructional salaries, and related supplies and services. I am not exactly sure if this is what the intent of your email is, but my interpretation of the terms "lower level" and "cost-efficient". As discussed above, it would be helpful to have a memo with explicit goals and objectives of what we would be trying to accomplish by engaging the North American Network of Science Labs Online (NANSLO) program.

(12) We currently do not have faculty or staff who are formally trained in the creation and support of online lab science at Western Oregon University. Based on a partial hallway straw poll, to my knowledge, none of our existing science

faculty have ever taken an online science class for credit, as part of their degree programs. Widespread deployment of an online science curriculum will require extensive training, hiring of new faculty and staff, and development of expertise in this area of web-science pedagogy. It will also likely require investment in additional facilities to support a web design environment addressing the custom needs associated with scientific inquiry. The cost of offering online lab science at WOU is currently unknown, and would require a marketing and revenue-expense analysis to determine whether it is even economically viable or if such a program would result in "cost efficiency" compared to the current bricks-and-mortar curriculum.

On-Line Lab Question/Discussion Summary

The Biology Department has discussed this issue over the course of 3 department meetings. Our determination is that on-line labs are not pedagogically appropriate in meeting our mission objectives, are not feasible, will not save money, will increase the costs for students, and will create student inequity. This is most true at the introductory Biology/LACC level where a majority of students lack key skills cited as necessary to succeed via on-line format courses (e.g. responsible study habits, access to and skills to work with on-line tools, and the self-discipline it takes to keep up with course requirements over time).

The Definition of a Laboratory

The WOU LACC science requirement defines LABORATORY as its essential and unique quality; students are required to complete 12-15 credits that all include face-to-face laboratory experiences. We define the essential qualities of a Biology Laboratory experience as:

- Experimentation – including scientific method and discovery/observation-driven experiences
- Physically Using Technical Equipment and Observing/Working With Living Organisms – including microscopes (integrated into all introductory courses), biosensors (integrated into 100 and A&P courses), and reagents/supplies (including controlled chemicals, biological specimens, and living organisms).
- Collaboration – working in small teams to carry out experiments and discuss/compare results.

Consider the following supportive statement regarding the University of California's (UC) prerequisite subject requirements: ***"On-line lab science courses will not be approved unless they include a supervised wet lab component. Since UC has not seen computer software that adequately replicates the laboratory experience, computer simulated labs and lab kits will not be acceptable. UC faculty considers the experimentation process a critical component of any laboratory science course because it brings the scientific process to life..."***

[source: http://www.ucop.edu/a-gGuide/ag/online_course.html]

Pedagogical Concerns

The model for learning science (as supported by NSTA, AAAS...) is that students need to be physically engaged (i.e., face-to-face) with laboratory experimentation and collaborative teamwork/discussion. This is also the model that K-12 teachers are expected to facilitate in their careers; hence the Biology 101 "real" laboratory requirement is essential for future K-12 teachers.

More damning, however, is the significant data that have been amassed regarding the fact that on-line courses fail to retain students and do so in a way that is biased AGAINST young students who have no experience in the college setting – PRECISELY the kinds of people who take OUR introductory science courses. If WOU's aim is to retain students through a satisfying educational experience, then we need to continue to facilitate pedagogically sound laboratory experiences and not set them up for failure because we think we are trying to save money. Here is a short-list of the MANY references about this problem; we hope that administrators will consider these ideas carefully in light of the campus mission statement and our historic strengths – particularly with first-generation, low-income, under-represented students who would be especially vulnerable to these problems.

Here is an especially salient quote from Jenkins' 2011 Chronicle of Higher Education report:
"With countless studies showing success rates in online courses of only 50 percent—as opposed to 70-to-75 percent for comparable face-to-face classes— isn't it time we asked ourselves some serious questions? Such as: Should every course be taught online? And should we allow every student—or any student who wishes to—to take online courses?"

- Jenkins, R. (2011). Why are so many students still failing online? Chronicle of Higher Education, May 2011. (http://chronicle.com/article/Why-Are-So-Many-Students-Still/127584/).
- 35 Additional Articles Reviewed/Cited In: Lee, Y., and Choi, J. (2011). A review of online course dropout research: implications for practice and future research. Education Technology Research and Development , 59: 593-618.
- Poellhuber, B., Chomienne, M., & Karsenti, T. (2008). The effect of peer collaboration and collaborative learning on self-efficacy and persistence in a learner-paced continuous intake model. Journal of Distance Education, 22(3), 41–62.

Professional School Concerns

As stated in the last section, future K-12 teachers need exposure to real, face-to-face laboratory experiences because hands-on/team engagement in science remains the pedagogical model for teaching science. For this reason, we MUST retain the laboratory experience in courses like Biology 101 (required for the Education Program). Likewise, an increasing number of professional schools DO NOT recognize on-line laboratory coursework as an acceptable substitute for the real thing (one key/popular local example being Linfield School of Nursing). For this reason, we MUST retain the laboratory experience in courses like Biology 102 (required for the Pre-Nursing Program).

Feasibility Concerns

As stated, existing lab curriculum in all introductory Biology labs employs extensive technical equipment and reagents (including microscopes, biosensors, controlled chemicals and biological specimens). The primary model that some programs use for facilitating on-line experimental Biology labs requires that students pay for and utilize take-home kits. Based on our research, commercially available kits cost $200-400 and do NOT include key pieces of equipment like microscopes – which students are somehow expected to find/use on their own; in reading additional fine print, we also noted a significant number of other hidden costs: mailing fees, extra materials (e.g. products from grocery stores, drug stores, etc.), and the need for students to own digital cameras. These are all SERIOUS economic burdens to ask of our students, most of whom can barely afford required textbooks. We did discuss whether cheaper kits could be designed/managed/sold on campus but concluded that the amount of money, time, and staffing required to support this kind of program has not been fully accounted for in perceptions about cost-savings – not to mention the fact that there are liability issues associated with and providing such materials to unsupervised students. And after reviewing some basic materials costs, we concluded there would be little cost reduction to students.

As an additional concern, we noted that commercially available kits all involve "canned/cookbook" exercises and do not reflect the existing labs that students presently carry out; we believe this is a serious and negative step backwards in teaching/learning progress given how much Biology faculty are involved in innovative and effective hands-on lab curriculum design (e.g. biosensor innovations during the last several years). Indeed, lab curriculum development and assessment data gathered by Biology faculty (Baumgartner/100 series, Boomer & Latham/211) suggests students learn better and are more satisfied with revised/new laboratory activities that increase hands-on experiences.

In addition to the kit component of the on-line lab experience, we also discussed the fact that we are concerned that necessary resources for instructional design, computational support, and exam supervision/facilitation have not been fully developed on this campus. Case in point: the OSU Extended Campus is supported by 41 staff, including a full-time exam coordinator (with supporting staff), and 10 specialists devoted to essential skills like: multimedia designer, web designer, instructional designer, graphic design specialist etc. Such resources are needed to provide an effective on-line interface, to ensure proper/fair assessment, to aid in the design of simulation labs, and to interface with simulation software (an additional expense in and of itself).

Cost-Benefit Analysis

Given our findings, we do not see opportunities for cost-savings. In addition, the following serious questions were raised during our discussions:

(1) Is it fair to strap students with take-home kit costs ($200-400), on top of all the other things we charge them for – particularly given that current labs cost $30 and provide students with the opportunity to use actual equipment (e.g. microscopes, biosensors, etc. – none of which are available via "cookbook" kits)?

(2) Introductory Biology labs hold 24 students and each lab instructor manages 3 assignments per week per student, plus 2 research papers per student over the course of the term. This class size is consistent with cited data regarding target/effective on-line classes. What is the administration's perception regarding on-line lab sizes and FTE crediting? Are their contractual issues that need to be addressed and defined with regards to on-line class/lab FTE credit models?

(3) Given cited OSU's Extended Campus staffing, what kinds of additional support staff and expertise (and how many) will WOU be investing in to facilitate more (and more elaborate) on-line offerings? Likewise, what kinds of computational infrastructure investments will be made?

(4) Given cited OSU's Extended Campus Chemistry* offerings, we suspect much of this instruction is carried out by graduate TA's – who make significantly less than TT/NTT Faculty. Has this been fully studied and accounted for in cost analysis?

***NOTE: OSU's Extended College offers NO on-line Biology labs; in fact, the only on-line Biology offerings were lecture courses at the 300 level.**

Without attention to class size/crediting, resource investment, and supporting the real instructional time required to facilitate on-line learning, evidence shows that there is no savings in time or effort; here are several citations:

- Bender, D., Wood, B.J., & Vredevoodg, J. (2004). Teaching Time: Distance Education versus Classroom Instruction. American Journal of Distance Education, 18(2), 103-114.
- Cavanaugh, J. (2005). Teaching Online – A Time Comparison. Online Journal of Distance Learning Administration, 8(1), on-line.
- Lazarus, B. (2003). Teaching Courses Online: How Much Time Does It Take? Journal of Asynchronous Learning, 7(3), 47-54.

Student Equity

Finally, we are very concerned about student equity and perceive a number of serious problems when we try to envision and compare an on-line student experience vs. a face-to-face lab student experience. The biggest concern regards the cost differential ($200-400 per limited/incomplete kit vs. $30 for a face-to-face lab using actual equipment). Given the kinds of students who take introductory biology at WOU, we are also concerned that they will not get the things they need from an on-line experience: face-to-face instruction, student collaboration/interaction, and structured, weekly accountability.

AGAIN: If WOU's aim it to retain students through a satisfying educational experience, then we need to continue to facilitate pedagogically sound laboratory experiences and not set them up for failure because we think we are trying to save money. We hope that administrators will consider these ideas carefully in light of the campus mission statement and our historic strengths – particularly with first-generation, low-income, under-represented students who would be especially vulnerable to these problems.

Online Possibilities for Chemistry

We investigated programs that offer the laboratory portion of chemistry courses online. OSU's ecampus offers both lecture and lab for non-chemistry major general chemistry and the non-chemistry major organic chemistry. Western has no directly parallel courses. These laboratory courses are not online options but rather hybrid courses requiring intense on- campus laboratory sessions. The organic chemistry laboratory is taught only during summer term and has a two week intense, required in portion which involves 63 in-lab, on campus working hours. Organic chemistry requires the mastery of techniques that can only be learned by physically handling and manupulating laboratory equipment. There would not be significant, if any at all, savings with such a hybrid offering. The laboratory portion of the ecampus general chemistry offering is also a hybrid with an intense weekend on campus laboratory portion. I can find no reputable university programs that offer online-only organic or science major general chemistry laboratories.

In addition to researching online lab programs offered by universities, I interviewed the Director of the Portland OSP Crime Laboratory. The OSP labs are the number one potential employers for our Forensic Chemistry graduates. I posed the question of how online laboratory courses would be evaluated as part of a potential employment candidate's application. I was told that an applicant that had completed any laboratory coursework in an online mode would be immediately removed from hiring consideration. I was told that the handling and manipulating of samples and the experience gained from having to work through experimental "trials and tribulations" is critical background for working in the crime lab. The crime lab director has no negative view of potential employees taking online lecture courses but was adamant that online laboratories would eliminate that individual from the pool.

We do have a number of lecture courses that are completely appropriate to an online delivery. However, we do not see feasibility of moving to some sort of online laboratory experience.

In Addition:

The Ch 100 sequence is required for the forensic science minor. Students graduating with this minor have been hired in the OSP crime lab. Making the Ch 100 sequence online would cause students who wish to attain employment with the OSP lab to be immediately removed from the pool of applicants.

12/6/2011

2011 - 2012 NSM DIVISION BUDGET

Budgeted amount for Supplies and Services	**NSM902 (July 1, 2011)**				**$30,202**	
SEP copy charges added - $1550				Expense	$30,202	
ESTIMATED GENERAL OFFICE OPERATING EXPENSES					$25,202	
Telecom (Phones and Networking)			138.09	$500		
Copiers			3534.56	$10,000		
Office Supplies & Book Store			5346.88	$4,000		
Postage			38.95	$500		
Duplicating Services			5.81	$300		
Faculty travel				$4,000		
Physical Plant - work orders			251.06	$2,500		
Telecommunication wiring			175	$1,000		
Miscellaneous	124 remodel		2368	$2,402		
TOTAL ESTIMATED GENERAL EXPENSES					$25,202	
MATHEMATICS	NSM902 Starting				$5,000	
Money already spent	NSM902				$882	
NSM941 Lab Fees					$2,000	
SEP/DEP MTH70-95 - Course-Related Toner-Copier-Supplies						
NSM941 Lab fees expended					$0	
Balance		Total balance			$6,118	
SCIENCE DEPARTMENT BUDGETS NSM922 STARTING July 1, 2011					$175,000	
BIOLOGY	NSM922 Starting				**$59,878**	$59,878
Summer lab fees rolled over into 2011-12					$4,100	
Money already spent					$23,391	
Balance					$40,587	
EARTH & PHYSICAL SCIENCE	NSM922 Starting				**$48,737**	$48,737
Summer lab fees rolled over into 2011-12					$1,850	
Money already spent					$9,928	
Balance					$40,659	
CHEMISTRY	NSM922 Starting				**$30,635**	$30,635
Summer lab fees rolled over into 2011-12					$950	
Money already spent					$4,822	
Glass breakage					$177	*Summer 20*
Balance					$26,940	
NATURAL SCIENCE STUDENT INFRASTRUCTURE AND OVERHEAD						
STUDENT LAB NETWORK	NSM922 Starting				**$5,500**	$5,500
Money already spent					$0	
Balance					$5,500	
STUDENT PAPER	NSM922 Starting				**$5,000**	$5,000
Money already spent					$0	
Balance					$5,000	
FIELD TRIP	NSM922 Starting				**$6,000**	$6,000
Money already spent					$1,787	
Balance					$4,213	
EQUIPMENT REPAIR	NSM922 Starting				**$2,500**	$2,500
Money already spent					$1,166	
Balance					$1,334	
Millipore DI Water Still	NSM922 Starting				$2,500	$2,500
Willamette Water (Softener)	NSM922 Starting				$0	$0
NW Natural Gas	NSM922 Starting				$250	$250
					$2,750	
Contingency 8% of Total NSM922 Budget					$14,000	$14,000
					TOTAL	$175,000