

**PLEASE NOTE:** *Members, when addressing Faculty Council, please stand and identify yourselves. Guests wishing to speak please fill out a guest card to be handed to the Chair prior to speaking.*

**PLEASE NOTE:** *Members planning to introduce amendments are requested to provide copies to the Faculty Council Office, 18A Administration, at least 24 hours before this meeting.*

## **AGENDA**

### **Faculty Council Meeting**

**Tuesday, November 5, 2013 - 4:00 p.m. - Room A201 Clark Building**

#### **I. ANNOUNCEMENTS**

- A. Next Faculty Council Meeting – December 3, 2013 - A201 Clark Building - 4:00 p.m.
- B. Executive Committee Meeting Minutes – October 8, 15, 22, and 29, 2013  
(<http://facultycouncil.colostate.edu/index.asp?url=links>)
- C. Proposed changes to the University Code to be voted on at the December 3, 2013 Faculty Council Meeting:
  - 1. *Manual* Section C.2.1.3.2 Ex-Officio Members (p. 134)
  - 2. *Manual* Section C.2.1.9.3 Membership and Organization (pp.134-136)
  - 3. *Manual* Section C.2.1.9.5.d Committee on Libraries (p. 137)
  - 4. *Manual* Section C.2.3.1.e Colleges and Academic Departments – College of Liberal Arts (p. 138)

#### **II. MINUTES TO BE APPROVED**

- A. Faculty Council Meeting Minutes – October 1, 2013 (pp.1-11)

#### **III. UNFINISHED BUSINESS**

- A. University Benefits Committee Election – Committee on Faculty Governance – (p. 12)
- B. Faculty Council Standing Committee Election – Committee on Faculty Governance – (p. 13 )

#### **IV. REPORTS TO BE RECEIVED**

- A. President – Tony Frank
  - a. Including discussion on parking
- B. Provost/Executive Vice President - Rick Miranda

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**Secretary's Note:** *Please detach at this line, print your name, and leave in attendance box at the Faculty Council meeting. If you must be absent, you are encouraged to send a substitute representative of academic faculty status in order to provide proper representation at the meeting. Substitutes should turn in the attendance slip at the meeting and indicate on the slip whom they are representing. Members will find it helpful to have copies of the Faculty Council, University Curriculum Committee and Executive Committee minutes available for reference at the meeting.*

- C. Faculty Council Chair - Timothy Gallagher
- C. Board of Governors Faculty Representative - Alexandra Bernasek

**V. CONSENT AGENDA**

- A. Changes to Curriculum Approved: University Curriculum Committee Minutes September 6, 2013 (pp. 14-18)
- B. Changes to Curriculum Approved: University Curriculum Committee Minutes September 20, 2013 (pp.19-22)
- C. Changes to Curriculum Approved: University Curriculum Committee Minutes September 27, 2013 (pp.23-26)
- D. Changes to Curriculum Approved: University Curriculum Committee Minutes October 4, 2013 (pp. 27-33)

**VI. ACTION ITEMS**

- A. Request for a new major in Neuroscience (B.S.) with concentration in Behavioral and Cognitive Neuroscience and Cell and Molecular Neuroscience. (pp. 34-88)
- B. Request for a new major in Statistics (B.S.) (pp. 89-125)
- C. Proposed Revisions to the *Manual*, Section F.3.4.1 – Conditions and Procedures for Granting Sabbatical Leave – Committee on Responsibilities and Standing of Academic Faculty (pp. 126-128)
- D. Proposed Revisions to the *Manual*, Section I.7 – Student Appeals of Grading Decisions – Committee on Responsibilities and Standing of Academic Faculty (p. 129)
- E. Approval of Academic Calendar – Fall Semester 2018 through Summer 2020 (pp.130-133)

**VII. DISCUSSION**

- A. None

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*Secretary's Note: Please detach at this line, print your name, and leave in attendance box at the Faculty Council meeting. If you must be absent, you are encouraged to send a substitute representative of academic faculty status in order to provide proper representation at the meeting. Substitutes should turn in the attendance slip at the meeting and indicate on the slip whom they are representing. Members will find it helpful to have copies of the Faculty Council, University Curriculum Committee and Executive Committee minutes available for reference at the meeting.*

Faculty Council Meeting Minutes  
October 1, 2013 – Page 1

To Faculty Council Members: Your critical study of these minutes is requested. If you find errors, please call, send a memorandum, or E-mail immediately to Kathy DuQuoin, ext 1-3985.

NOTE: Final revisions are noted in the following manner: additions underlined; deletions ~~over-scored~~.

***MINUTES  
FACULTY COUNCIL  
October 1, 2013***

***CALL TO ORDER***

The Faculty Council meeting was called to order at 4:00 pm by Timothy Gallagher, Chair

***ANNOUNCEMENTS***

- A. Next Faculty Council Meeting – November 5, 2013 - A201 Clark Building - 4:00 p.m.

Gallagher announced that the next regularly scheduled Faculty Council meeting will be held on Tuesday, November 5, 2013 in A201 Clark Building at 4:00 pm.

- B. Executive Committee Meeting Minutes – September 10, 17, and 24 2013  
(<http://facultycouncil.colostate.edu/index.asp?url=links>)

Gallagher announced that the September 10, 17, and 24, 2013 Executive Committee meeting minutes have been posted on the Faculty Council website for Faculty Council members information. (<http://facultycouncil.colostate.edu/index.asp?url=links>)

***MINUTES TO BE APPROVED***

- A. Faculty Council Meeting Minutes – September 3, 2013

By unanimous consent, the September 3, 2013 Faculty Council Meeting Minutes were approved.

### ***REPORTS TO BE RECEIVED***

#### **A. Provost/Executive Vice President - Rick Miranda**

Miranda reported the following activities:

1. At last month's Fall Address, President Frank spoke on a new initiative to improve situations for non-tenure track faculty. Focus areas include compensation, job security and multi-year contracts, opportunities for professional development, and better integration and inclusion within the department.

David Gilkey, College of Veterinary Medicine and Biomedical Sciences, asked Miranda if this would include revision of Department Codes. Miranda responded that yes, revision of Department Codes is included in point 4 (inclusion and integration).

2. The new Walter and Suzanne Scott Engineering Building was opened.

3. Phase Zero retreat was held with the Council of Deans, where they examined emerging curricular proposals within academic units.

4. A New Department Chair orientation was held recently.

5. Miranda visited an additional five departments: Geosciences, Math, Design and Merchandising, Soil and Crop Sciences, and Biomedical Sciences.

6. Miranda participated in an international mathematics conference in Warsaw, Poland.

7. Miranda introduced Alan Rudolph, the new Vice President for Research.

Miranda's report was received.

#### **B. Faculty Council Chair - Timothy Gallagher**

Gallagher reported the following activities:

1. A news article was published in the Wall Street Journal on Saturday, September 28, 2013 that discussed the proposed on-campus football stadium. Gallagher is quoted in the article.

2. Gallagher serves on the committee that distributes money for the CSU Cares fund, which provides relief funds to CSU faculty, staff and students impacted by natural disasters. Gallagher asked FC members to consider donating to the fund to help the CSU community members who were affected by the recent flood. He also encouraged FC members to have individuals in

need of assistance contact the CSU Cares Committee.

3. Gallagher met with David Mornes, Chair of the Administrative Professional Council, and Jeff Sturgeon, Chair of the State Classified Council, and discussed a potential proposal to privatize parking on CSU campus. Executive Committee has voted to place this issue on the November 5, 2013 Faculty Council meeting agenda.

Gallagher's report was received.

C. Board of Governors Faculty Representative - Alexandra Bernasek

Bernasek reported the following:

1. Bernasek announced that the BOG will meet this week, October 3-4, 2013. There will be a Public comment time Friday morning. If FC members have questions they would like to pose, or an issue to raise, they can attend the open comment time and speak to the Board.
2. Bernasek reported that she is keeping a running list of faculty issues to report to the BOG. FC members with issues or concerns can send them to Bernasek to add to her list.

Bernasek's report was received.

### ***CONSENT AGENDA***

- A. Approval of Degree Candidates – Fall Semester 2013
- B. Changes to Curriculum Approved: University Curriculum Committee Minutes May 10, 2013
- C. Changes to Curriculum Approved: University Curriculum Committee Minutes August 30, 2013

Carole Makela, Chair of University Curriculum Committee, moved that the Faculty Council approve the above Consent Agenda items.

Makela's motion was adopted and the Consent Agenda items were approved.

### ***ACTION ITEMS***

A. Elections – Student Representatives (Graduate and Undergraduate) – Faculty Council Standing Committees – Committee on Faculty Governance

Diane Lunde, Vice Chair of Committee on Faculty Governance, moved that the Faculty Council adopt the undergraduate and graduate students nominated to serve on Faculty Council Standing Committees.

Lunde's motion was adopted and all students nominated were elected to one-year terms on the Faculty Council Standing Committees, beginning immediately to June 30, 2014.

**DISCUSSION**

A. INTO CSU Update – John Didier, INTO CSU Director and Fabiola Ehlers-Zavala, INTO CSU Academic Director

Didier and Ehlers-Zavala began the discussion with a PowerPoint presentation on academic aspects of the INTO CSU program. The PowerPoint presentation is available on the Faculty Council website.

The following discussion was held after the presentation:

Mary Van Buren, Anthropology, asked for the names of members, in addition to Provost Miranda, serving on the INTO CSU Joint Venture Board. Didier replied that the other Board members are Kathleen Henry, President and CEO of CSURF, and Amy Parsons, Vice President for University Operations.

Eric Aoki, Liberal Arts, asked for clarification on the kind of student accepted into the Pathway program. Ehlers-Zavala responded that students accepted into the INTO CSU program are generally students who are below the TOEFL score requirement for direct admission into academic programs, but who have strong academic potential.

Mary Van Buren, Anthropology, asked if Pathway students are required to take AUCC requirements during their first year in the program. Ehlers-Zavala responded that the sequence of courses is dependent on individual academic units.

Mike McCulloch, Philosophy, asked for clarification in the course sequence of the Pathway program. He noted that it appeared that students appear to transition into their academic departments in the second semester, and this was confirmed by Ehlers-Zavala.

Suren Chen, Civil and Environmental Engineering, asked about admission into the INTO CSU program, and what specific guidelines were used to determine academic potential. Ehlers-Zavala

responded that they look at GPA, specific coursework already taken, etc., and that the specific guidelines vary according the determined requirements of individual academic units.

Mary Van Buren, Anthropology, asked for clarification and Ehlers-Zavala confirmed that admission requirements can differ between admission into Pathway programs and academic units. Students in the INTO CSU program must meet department requirements to be admitted into the department after completing the Pathway program.

Steve Robinson, Physics, asked Gallagher for clarification of issues that were raised within EC and if Didier and Ehlers-Zavala could address these issues.

Bernasek summarized the following issues discussed by EC, including how many students who complete the Pathway program are then admitted into departments and how many of these students are successful in undergraduate and graduate programs. Bernasek raised the concern that students admitted into the INTO CSU program are not performing well. Bernasek also asked what standards INTO CSU is using to assess themselves.

Robinson asked why INTO CSU students are sometimes given preferential acceptance into crowded classes, ahead of other CSU students who are wait-listed. Didier replied that this was part of the INTO contract with CSU because CSU is legally bound to honor curriculum and time lines advertised through INTO CSU.

Martin Shields, Economics, asked if INTO CSU tuition dollars received by departments could be used to fund faculty positions to meet the demands of growing student numbers. Didier responded that departments are free to use the tuition dollars as they see fit.

Antonio Pedros-Gascon, Foreign Languages and Literatures, commented that we should not expect that GPAs from one country and the US might not be comparable due to grade inflation.

Iuliana Oprea, College of Natural Sciences, asked if there was a target number of INTO CSU students to admit every year, if that target is being met, and if a number of seats within classes are being reserved specifically for INTO CSU students. Didier responded that INTO CSU does reserve a number of seats in some classes but that the actual number of seats taken by INTO CSU students isn't known sometimes until the last minute due to VISA issues or academic preparation issues. Once the number of seats that will be filled with INTO CSU students is known, the remainder of reserved seats are released to wait-listed students. Ehlers-Zavala added that forecasting the number of seats to reserve is very challenging, but as the INTO CSU program evolves, they will have a better idea of how many seats to reserve. INTO CSU's target number is 1200 students at the 5<sup>th</sup> year of INTO CSU, about half of which will be in the Pathway program.

Margarita Lenk, Accounting, told of her experience with INTO CSU students who are requesting additional time for tests because they are INTO CSU students. Margarita communicated to FC

that there are cases when these students are getting more time than other CSU students. Didier replied that this should not be allowed, because INTO CSU students are to follow CSU standards and guidelines and that INTO CSU does not encourage students to ask for additional time.

David Gilkey, College of Veterinary Medicine and Biomedical Sciences, asked what advising and initial support is provided to INTO CSU students. Didier responded that INTO CSU has one full time advisor, is hiring a second full time advisor, and has a case manager and a few other staff to provide support. In addition, INTO CSU works with academic units to identify advising resources for INTO CSU students.

Didier provided performance data to FC, some of which were shown in the PowerPoint presentation (GPAs).

Steve Robinson, Physics, asked if INTO CSU students could apply for residency at CSU, and Didier and Ehlers-Zavala responded no.

Margarita Lenk, Accounting, asked about INTO's strategy, if it was to move students through the Pathways program and then into degree programs. Didier responded yes, that is the strategy. As INTO CSU evolves and matures, INTO CSU will be able to better predict the success of students and how many seats to reserve.

Alex Bernasek, BOG Faculty Representative, noted that she has experience with General English INTO CSU students who are being advised to apply to the Economics graduate program, and that these students are performing poorly in the graduate program after being admitted. These students appear to be leveraging the INTO CSU program to gain admittance. Bernasek asked how many General English students matriculate into degree programs and Didier responded none and clarified that all INTO CSU students must go through the Pathway program to be considered for degree programs.

Roger Culver, College of Natural Sciences, asked if course sections are segregated, and Didier responded that this is not the desire of INTO CSU, except for a few courses such as one in Engineering.

J.T. Hughes, College of Liberal Arts, asked if INTO CSU provides funds up front for instructors if course sections need to be added to accommodate increased enrollment, and Didier responded yes, that INTO CSU does pay upfront.

Stephen Hayne, Computer Information Systems, asked what happens if INTO CSU pays for an instructor up front but then shortly after the INTO CSU seats are not filled. Didier responded that the funds could be returned to INTO CSU or reserved for an instructor in the future. Hayne noted that it isn't clear how INTO CSU tuition is translated into permanent faculty lines, which are usually negotiated with the Provost. Provost Miranda acknowledged that some CSU students are



being displaced right now, but that the stress due to INTO CSU students is just one part of the overall enrollment growth stress being felt on campus. Miranda added that once INTO CSU reaches steady-state, tuition income from INTO CSU will be stable, with about half the tuition going to the department. Departments will then be more confident of revenue streams and can decide how to allocate those funds as they see fit, whether it is hiring TAs, non-tenure track faculty, or tenure-track faculty.

Patricia Ryan, Finance and Real Estate, asked for clarification on the listed GPA (2.8) of an INTO CSU student who progressed into the department of Finance and Real Estate. It was noted that this GPA is below the 3.0 GPA requirement of the Graduate School. Miranda responded that admission into the graduate program is ultimately determined by the department, which sometimes relaxes the 3.0 GPA requirement based on other performance metrics.

Ehlers-Zavala and Didier ended the discussion by speaking of INTO CSU's commitment to student success and reiterated that INTO CSU holds each student to CSU's standards. Lastly, Didier asked FC to refer INTO as INTO-CSU, to reflect that INTO is part of CSU.

The Faculty Council meeting adjourned at 5:43 p.m.

Timothy Gallagher, Chair  
Mary Stromberger, Vice Chair  
Kathy DuQuoin, Interim Executive Assistant

#### *ATTENDANCE*

***BOLD INDICATES PRESENT AT MEETING***

***UNDERLINE INDICATES ABSENT AT MEETING***

**Agricultural Sciences**  
**Norman Dalsted**

Agricultural and Resource Economics

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<u>Denny Crews</u>	Animal Sciences
<b>Deb Young</b>	Bioagricultural Sciences & Pest Management
<b>Bradley Goetz</b>	Horticulture & Landscape Architecture
<u>Francesca Cotrufo</u>	Soil and Crop Sciences
<b>Milt Thomas</b>	College-at-Large
<b>Kelly Curl</b>	College-at-Large

**Business**

<b>Margarita Lenk</b>	Accounting
<b>Stephen Hayne</b>	Computer Information Systems
<b>Patricia Ryan</b>	Finance and Real Estate
<b>Troy Mumford</b>	Management
(substituting for Jim McCambridge)	
<b>Kelly Martin</b>	Marketing

**Engineering**

<b>Russ Schumacher</b>	Atmospheric Science
<b>Travis Bailey</b>	Chemical and Biological Engineering
<b>Suren Chen</b>	Civil and Environmental Engineering
<b>Steve Reising</b>	Electrical and Computer Engineering
<u>Azar Yalin</u>	Mechanical Engineering
<b>Eric Maloney</b>	College-at-Large
<b>Jose Chavez</b>	College-at-Large
<u>Sudeep Pasricha</u>	College-at-Large
(substituting for J. Rockey Luo through Spring 2014)	

**Health and Human Sciences**

<b>Stephanie Clemons</b>	Design and Merchandising
<b>Tracy Nelson-Ceschin</b>	Health and Exercise Science
<b>David Sampson</b>	Food Science and Human Nutrition
<b>Jenn Matheson</b>	Human Development and Family Studies
<b>Scott Glick</b>	Construction Management
<b>David Greene</b>	Occupational Therapy
<b>Sharon Anderson</b>	School of Education
<b>Kim Bundy-Fazioli</b>	School of Social Work

**Liberal Arts**

<b>Mary Van Buren</b>	Anthropology
<u>Marius Lehene</u>	Art
(Substitute for Eleanor Moseman thru Spring 2014)	
<b>Elizabeth Williams</b>	Communication Studies
<b>Martin Shields</b>	Economics

<u>Michael Lundblad</u>	English
<b>Ernesto Sagas</b>	Ethnic Studies
<b>Antonio Pedros-Gascon</b>	Foreign Languages and Literatures
<b>Robert Gundmestad</b>	History
<u>Cindy Christen</u>	Journalism and Technical Communication
<b>Gary Moody</b>	Music, Theater, and Dance
<b>Michael McCulloch</b>	Philosophy
<b>Bradley MacDonald</b>	Political Science
<b>Ken Berry</b>	Sociology
<b>Mary Vogl</b>	College-at-Large
<b>Joylon Hughes</b>	College-at-Large
<b>Eric Aoki</b>	College-at-Large

#### **Natural Resources**

<u>Melinda Laituri</u>	Ecosystem Science and Sustainability
<b>Paul Doherty</b>	Fish, Wildlife, and Conservation Biology
<u>Yu Wei</u>	Forest, Rangeland, & Watershed Stewardship
<b>Sven Egenhoff</b>	Geosciences
<b>Stu Cottrell</b>	Human Dimensions of Natural Resources

#### **Natural Sciences**

TBA	Biochemistry and Molecular Biology
<b>David Steingraeber</b>	Biology
<u>John Wood</u>	Chemistry
<u>Ross McConnell</u>	Computer Science
<b>Iuliana Oprea</b>	Mathematics
<b>Raymond 'Steve' Robinson</b>	Physics
<b>Zinta Byrne</b>	Psychology
<b>Geof Givens</b>	Statistics
<b>Ed DeLosh</b>	College-at-Large
<b>Christos Papadopoulos</b>	College-at-Large
<b>Roger Culver</b>	College-at-Large
<b>Martin Gelfand</b>	College-at-Large

(substituting for Carl Patton)

#### **Veterinary Medicine and Biomedical Sciences**

<b>Elaine Carnevale</b>	Biomedical Sciences
<u>Howard Seim</u>	Clinical Sciences
<b>John Rosecrance</b>	Environmental and Radiological Health Sciences
<u>Gary Mason</u>	Microbiology, Immunology and Pathology
<b>Terry Nett</b>	College-at-Large
<u>Jeffrey Wilusz</u>	College-at-Large
<b>C. W. Miller</b>	College-at-Large

<u>Pete Hellyer</u>	College-at-Large
<b>David Gilkey</b>	College-at-Large
<u>E. J. Ehrhart</u>	College-at-Large
<b>Melinda Frye</b>	College-at-Large
<u>Ronald B. Tjalkens</u>	College-at-Large

#### **University Libraries**

<b>Louise Feldman</b>	Libraries
(substituting for Nancy Hunter)	
<b>Rachel Erb</b>	At-Large

#### **Officers**

<b>Tim Gallagher</b>	Chair, Faculty Council
<b>Mary Stromberger</b>	Vice Chair, Faculty Council
<b>Alex Bernasek</b>	BOG Faculty Representative
<b>Kathy DuQuoin</b>	Executive Assistant/Secretary
<b>Lola Fehr</b>	Parliamentarian

#### **Ex Officio Voting Committee Chair Members**

<b>Diane Lunde</b>	Chair Committee on Faculty Governance
(substituting for Don Estep)	
<u>Susan LaRue</u>	Chair Committee on Intercollegiate Athletics
<u>Jerry Magloughlin</u>	Chair Committee on Libraries
<b>David Greene*</b>	Chair Committee on Responsibilities and Standing of Academic Faculty
<b>Mark Zabel</b>	Chair Committee on Scholarship Research and Graduate Education
<b>Melinda Frye*</b>	Chair Committee on Scholastic Standards
<u>Jeff Wilusz*</u>	Chair Committee on Strategic and Financial Planning
<b>Stephanie Clemons*</b>	Chair Committee on Teaching and Learning
<u>Eric Prince</u>	Chair Committee on University Programs
<b>Carole Makela</b>	Chair University Curriculum Committee

\*Indicates Member of Faculty Council

#### **Ex Officio Non-Voting Advisory Committee Chair Members**

<b>Jennifer Aberle</b>	Chair Committee on Faculty Governance
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#### **Ex Officio Non-Voting Members**

<u>Anthony Frank</u>	President
<b>Rick Miranda</b>	Provost/Executive Vice President
<u>Brett Anderson</u>	Vice President for Advancement

Mary Ontiveros

Lou Swanson

Robin Brown

**Daniel Bush**

Patrick Burns

Jim Cooney

Tom Milligan

**Alan Rudolph**

**Blanche M. Hughes**

**Kathleen Pickering**

Amy Parsons

Craig Beyroudy

Jeff McCubbin

Ajay Menon

David McLean

Jodie Hanzlik

Ann Gill

Jan Nerger

Mark Stetter

Joyce Berry

**David Mornes**

Vice President for Diversity

Vice President for Engagement/Director of Extension

Vice President for Enrollment and Access

Vice Provost for Faculty Affairs

Vice President for Information Technology/Dean University Libraries

Vice Provost for International Affairs

Vice President for Public Affairs

Vice President for Research

Vice President for Student Affairs

Vice Provost for Undergraduate Affairs

Vice President for University Operations

Dean, College of Agricultural Sciences

Dean, College of Applied Human Sciences

Dean, College of Business/Executive Dean

Dean, College of Engineering

Dean, Graduate School

Dean, College of Liberal Arts

Dean, College of Natural Sciences

Dean, College of Veterinary Medicine and Biomedical Sciences

Dean, Warner College of Natural Resources

Chair, Administrative Professional Council

**UNFINISHED BUSINESS  
OFFICIAL BALLOT - BENEFITS COMMITTEE  
November 5, 2013**

**Nominee:**

**College:**

**Term:**

**Torsten Eckstein**

**CVMBS**

**2013-2015**

**Nominations from the Floor:**

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**BALLOT**  
**Academic Faculty Nominations to Faculty Council Standing Committees**  
**November 5, 2013**

**Committee on Scholarship, Research, and Graduate Education**

<b><u>Vicki Buchan</u></b> (Nominated by Committee on Faculty Governance)	Health and Human Sciences	2014
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**Committee on University Programs**

<b><u>Tian Wang</u></b> (Nominated by Committee on Faculty Governance)	Business	2015
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<b><u>Anireddy Reddy</u></b> (Nominated by Committee on Faculty Governance)	Natural Sciences	2014
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A regular meeting of the University Curriculum Committee was held on September 6, 2013, at 2:00 p.m.

Members present Chair Carole Makela, Professors Bradley Goetz, Paul Mallette, Patrick Fitzhorn, Nancy Jianakoplos, Paul Meiman, Steve Strauss, Howard Ramsdell, Michelle Wilde, graduate representative Andrew Bondi, and Kathleen Pickering (ex-officio).

Absent: Sam Guinn.

Guests: Carrie Middleton and Linda Selkirk.

## Minutes

The minutes of August 30, 2013, were approved.

## Experimental Course Report

The Experimental Course report was received.

## Consent Agenda

The Consent Agenda was approved.

## CURRICULAR REQUESTS

NT-O, offered as nontraditional, online course.

The following curricular requests were approved.

## New Courses

## Effective Date

**LB 193 01(0-0-1). Concepts/Critical Thinking in Liberal Arts.** F, S. Spring Semester 2014  
Prerequisite: Declared majors within the College of Liberal Arts; written consent of instructor.

Concepts and success strategies essential to the Liberal Arts. Students create a comprehensive academic plan.

**NB 192 01(0-0-1). Introductory Neuroscience Seminar.** F, S. Prerequisite: Fall Semester 2014  
Written consent of instructor.

Introduction to neuroscience; discussion of concentrations, career paths and research opportunities. Group activities and strategies for success.

**NB 499 03(0-0-3). Senior Thesis.** F, S, SS. Prerequisite: NB 399; senior standing in the Neuroscience major. Fall Semester 2015

Interpreting research results (experiential or from the literature) and writing a thesis; oral presentation required; supervised by a faculty mentor.

**POLS 442 03(3-0-0). Environmental Politics in Developing World.** F, S, SS. Spring Semester 2014  
Prerequisite: POLS 241.

Examines environmental politics in developing countries and evaluates climate change, natural resource governance and environmental justice.



## Major Change to Courses

## Effective Date

ANTH 370 03(3-0-0). Primate Behavior and Ecology, **change to:**

Spring Semester 2014

**ANTH 370 03(3-0-0). Primate Behavior and Ecology.** F, S, SS. Prerequisite: ANTH 120 or BZ 101.

Behavioral patterns, ecological relationships, and communication of nonhuman primates. (NT-O)

[Approved as a nontraditional online course.]

ANTH 493 01(0-0-1). Capstone Seminar, **change to:**

Spring Semester 2014

**ANTH 493 01(0-0-1). Capstone.** F, S, SS. Prerequisite: Concurrent registration in a 4A course (see department list).

Linkages between anthropological subfields and how professional anthropologists approach issues.

ART 418 03(2-0-1). Contemporary Artists and Art Critics, **change to:**

Spring Semester 2014

**ART 418 03(3-0-0). Contemporary Artists and Art Critics.** S. Prerequisite ART 212.

Critical study of contemporary artists and art criticism.

## New Curricula

### Molecular, Cellular, and Integrative Neuroscience Special Academic Unit

#### Major in Neuroscience

Effective Fall 2014

#### Behavioral and Cognitive Neuroscience Concentration

(The entire program is shown.)

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
<b>FRESHMAN</b>			
CHEM 111 <sup>P</sup>	General Chemistry I	4	3A
CHEM 112 <sup>P</sup>	General Chemistry Laboratory I	1	3A
CHEM 113 <sup>P</sup>	General Chemistry II	3	
CHEM 114 <sup>P</sup>	General Chemistry Laboratory II	1	
CO 150 <sup>P</sup>	College Composition	3	1A
LIFE 102 <sup>P</sup>	Attributes of Living Systems	4	3A
LIFE 201B <sup>P</sup>	Introductory Genetics: Molecular, Immunological, Developmental	3	3A
LIFE 203 <sup>P</sup>	Introductory Genetics Laboratory	2	
MATH 155 <sup>P</sup>	Calculus for Biological Scientists I	4	1B
NB 192 <sup>P</sup>	Introductory Neuroscience Seminar	1	
PSY 100	General Psychology	3	3C
	Arts and Humanities <sup>1</sup>	3	3B
	<b>TOTAL</b>	<b>32</b>	
<b>SOPHOMORE</b>			
CHEM 341 <sup>P</sup>	Modern Organic Chemistry I	3	
CHEM 343 <sup>P</sup>	Modern Organic Chemistry II	3	
CHEM 344 <sup>P</sup>	Modern Organic Chemistry Laboratory	2	
CO 300 <sup>P</sup>	Writing Arguments	3	2

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
<u>OR</u>			
CO 301B <sup>p</sup>	Writing in the Disciplines—Sciences	3	2
LIFE 210 <sup>p</sup>	Introductory Eukaryotic Cell Biology	3	
LIFE 212 <sup>p</sup>	Introductory Cell Biology Laboratory	2	
PH 121 <sup>p</sup>	General Physics I	5	3A
<u>OR</u>			
PH 141 <sup>p</sup>	Physics for Scientists and Engineers I	5	3A
PSY 250 <sup>p</sup>	Research Methods in Psychology	4	
PSY 252 <sup>p</sup>	Mind, Brain, and Behavior	3	
	Arts and Humanities <sup>1</sup>	3	3B
	<u>TOTAL</u>	<u>31</u>	
<b>JUNIOR</b>			
BC 351 <sup>p</sup>	Principles of Biochemistry	4	
BMS 300 <sup>p</sup>	Principles of Human Physiology	4	
BMS 345 <sup>p</sup>	Functional Neuroanatomy	4	
NB 399 <sup>p</sup>	Thesis Preparation	1	
PSY 352 <sup>p</sup>	Learning and Memory	3	
<u>OR</u>			
PSY 452 <sup>p</sup>	Cognitive Psychology	3	
PSY 458 <sup>p</sup>	Cognitive Neuroscience	3	4B
PSY 459 <sup>p</sup>	Cognitive Neuroscience Laboratory	2	4A
STAT 301 <sup>p</sup>	Introduction to Statistical Methods	3	
<u>OR</u>			
STAT 307 <sup>p</sup>	Introduction to Biostatistics	3	
	Global and Cultural Awareness <sup>2</sup>	3	3E
	Historical Perspectives <sup>3</sup>	3	3D
	<u>TOTAL</u>	<u>30</u>	
<b>SENIOR</b>			
BMS 325 <sup>p</sup>	Cellular Neurobiology	3	
NB 493 <sup>p</sup>	Senior Seminar	1	4C
NB 499 <sup>p</sup>	Senior Thesis	3	4A, 4C
PSY 454 <sup>p</sup>	Biological Psychology	3	
PSY 455 <sup>p</sup>	Biological Psychology Laboratory	2	
PSY 456 <sup>p</sup>	Sensation and Perception	3	4B
PSY 457 <sup>p</sup>	Sensation and Perception Laboratory	2	
	Electives <sup>4</sup>	10	
	<u>TOTAL</u>	<u>27</u>	

**PROGRAM TOTAL = 120 credits**

<sup>p</sup> This course has at least one prerequisite. Check the Courses of Instruction section of the catalog at <http://catalog.colostate.edu> to see the course prerequisites.

<sup>1</sup> Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L\* 200 and L\* 201) foreign language courses.

<sup>2</sup> Select from the list of courses in category 3E in the AUCC.

<sup>3</sup> Select from the list of courses in category 3D in the AUCC.

<sup>4</sup> Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper division.

**Major in Neuroscience**  
**Cell and Molecular Neuroscience Concentration**

**Effective Fall 2014**

(The entire program is shown.)

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
<b>FRESHMAN</b>			
CHEM 111 <sup>P</sup>	General Chemistry I	4	3A
CHEM 112 <sup>P</sup>	General Chemistry Laboratory I	1	3A
CHEM 113 <sup>P</sup>	General Chemistry II	3	
CHEM 114 <sup>P</sup>	General Chemistry Laboratory II	1	
CO 150 <sup>P</sup>	College Composition	3	1A
LIFE 102 <sup>P</sup>	Attributes of Living Systems	4	3A
LIFE 201B <sup>P</sup>	Introductory Genetics	3	3A
LIFE 203 <sup>P</sup>	Introductory Genetics Laboratory	2	
MATH 155 <sup>P</sup>	Calculus for Biological Scientists I	4	1B
NB 192	Introductory Neuroscience Seminar	1	
PSY 100	General Psychology	3	3C
	Arts and Humanities <sup>1</sup>	3	3B
	<u>TOTAL</u>	<u>32</u>	
<b>SOPHOMORE</b>			
CHEM 341 <sup>P</sup>	Modern Organic Chemistry I	3	
CHEM 343 <sup>P</sup>	Modern Organic Chemistry II	3	
CHEM 344 <sup>P</sup>	Modern Organic Chemistry Laboratory	2	
CO 300 <sup>P</sup>	Writing Arguments	3	2
	<u>OR</u>		
CO 301B <sup>P</sup>	Writing in the Disciplines	3	2
LIFE 210 <sup>P</sup>	Introductory Eukaryotic Cell Biology	3	
LIFE 212 <sup>P</sup>	Introductory Cell Biology Laboratory	2	
MATH 255 <sup>P</sup>	Calculus for Biological Scientists II	4	1B
PH 121 <sup>P</sup>	General Physics I	5	3A
	<u>OR</u>		
PH 141	Physics for Scientists and Engineers I	5	3A
PSY 252 <sup>P</sup>	Mind, Brain, and Behavior	3	
	Arts and Humanities <sup>1</sup>	3	3B
	<u>TOTAL</u>	<u>31</u>	
<b>JUNIOR</b>			
BC 401 <sup>P</sup>	Comprehensive Biochemistry I	3	4A
BC 403 <sup>P</sup>	Comprehensive Biochemistry II	3	4B
BC 404 <sup>P</sup>	Comprehensive Biochemistry Laboratory	2	
BMS 300 <sup>P</sup>	Principles of Human Physiology	4	
BMS 345 <sup>P</sup>	Functional Neuroanatomy	4	
NB 399	Thesis Preparation	1	
PH 122 <sup>P</sup>	General Physics II	5	3A
	<u>OR</u>		
PH 142 <sup>P</sup>	Physics for Scientists and Engineers II	5	3A
STAT 301 <sup>P</sup>	Introduction to Statistical Methods	3	
	<u>OR</u>		
STAT 307 <sup>P</sup>	Introduction to Biostatistics	3	
	Global and Cultural Awareness <sup>2</sup>	3	3E
	Historical Perspectives <sup>3</sup>	3	3D
	<u>TOTAL</u>	<u>31</u>	
<b>SENIOR</b>			
BC 465 <sup>P</sup>	Molecular Regulation of Cell Function	3	
BMS 325	Cellular Neurobiology	3	
MIP 300 <sup>P</sup>	General Microbiology	3	
MIP 342 <sup>P</sup>	Immunology	4	
NB 493	Senior Seminar	1	4C

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
NB 499	Senior Thesis	3	
	Electives <sup>4</sup>	9	
	<u>TOTAL</u>	<u>26</u>	

**PROGRAM TOTAL = 120 credits**

<sup>1</sup> This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

<sup>1</sup> Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L\* 200 and L\* 201) foreign language courses.

<sup>2</sup> Select from the list of courses in category 3E in the AUCC.

<sup>3</sup> Select from the list of courses in category 3D in the AUCC.

<sup>4</sup> Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper division.

### **Request to Add a Major with Concentrations in Neuroscience**

A request by the Molecular, Cellular, and Integrative Special Academic Unit to add a major in Neuroscience, with concentrations in Behavioral and Cognitive Neuroscience and Cell and Molecular Neuroscience, was approved. The proposed effective date, pending approval of the updated Phase I and II by the Council of Deans, special action by Faculty Council, approval by Board of Governors, and CCHE, is Fall Semester 2014.

### **The Maximum Number of Experimental Courses per Level**

UCC members unanimously approved dropping the maximum of two courses per level per semester limit. Departments may offer as many experimental courses at the appropriate level as needed. The recommended effective date, subject to approval by Faculty Council, is Spring Semester 2014.

The meeting adjourned at 5:00 p.m.

(FC) 9/20/13

Carole Makela, Chair  
Tom Hoehn, Secretary

A regular meeting of the University Curriculum Committee was held on September 20, 2013, at 2:00 p.m.

Members present: Chair Carole Makela, Professors Bradley Goetz, Paul Mallette, Patrick Fitzhorn, Nancy Jianakoplos, Paul Meiman, Steve Strauss, Howard Ramsdell, Mike Culbertson for Michelle Wilde, graduate representative Andrew Bondi, undergraduate representative Sam Guinn, and Kathleen Pickering (ex-officio).

Guests: Fionna Bright, Kelley Brundage, Carrie Middleton, and Linda Selkirk

## Minutes

The minutes of September 6, 2013, were approved.

## Experimental Course Report

The Experimental Course report was received.

## Consent Agenda

The Consent Agenda was approved.

## CURRICULAR REQUESTS

NT-O, offered as nontraditional, online course.

The following curricular requests were approved.

### New Courses

### Effective Date

**CIVE 543 03(2-3-0). Instrumental Environmental Analysis. F.** Prerequisite: CIVE 539 or concurrent registration. Fall Semester 2014

Environmental sampling and preservation techniques followed by the instrumental analysis of the samples.

**GR 330 03(3-0-0). Urban Geography. F, S, SS.** Prerequisite: GR 100. Spring Semester 2014

Spatial distribution of urban areas and the geographic similarities and contrasts that exist between and within them. (NT-O)

[Approved as a new traditional and new nontraditional online course.]

**MIP 643 01(1-0-0). Grant Writing for Microbiology/Pathology. S.** Spring Semester 2014  
Prerequisite: Enrollment in a MIP graduate program.

To effectively communicate ideas, goals and approaches in a scientific grant proposal.

**WR 511 03(3-0-0). Water Resource Development. S.** Prerequisite: Graduate standing; written consent of instructor. Spring Semester 2014

Basic principles of water resource management including surface and subsurface flows. (NT-O)

[Approved as a new nontraditional online-only course.]

### Major Change to Courses

### Effective Date

**AGRI 330/PHIL 330 03(3-0-0). Agricultural Ethics, change to:**

Spring Semester 2014

**AGRI 330/PHIL 330 03(3-0-0). Agricultural and Food System Ethics. S.**  
 Prerequisite: CO 150. Credit not allowed for both AGRI 330 and PHIL 330.

Basic concepts in ethics and their application to agriculture and the food system.

**ATS 695 Var. Independent Study, change to:** Spring Semester 2014

**ATS 695A Var. Independent Study: Atmospheric/Ocean Coupling. F, S, SS.**  
 A.) Ocean-Atmosphere Interaction.

**BUS 220 03(3-0-0). Ethics in Contemporary Organizations, change to:** Spring Semester 2014

**BUS 220 03(3-0-0). Ethics in Contemporary Organizations. F, S. Prerequisite:**  
 none.

Examination and application of the ethical principles that are fundamental to managing a successful, high-integrity business or organization.

[Approved as an All University Core Curriculum (core) category 3B course.]

**CIVE 445 03(3-0-0). Sustainable Water and Waste Management, change to:** Spring Semester 2014

**CIVE 575 03(3-0-0). Sustainable Water and Waste Management. S.**  
 Prerequisite: CIVE 322 or ENVE 322. Credit not allowed for both CIVE 445 and CIVE 575.

The science, engineering, and policy behind sustainable water and waste practices. Sustainable urban water and wastewater management. (NT-O)

[Approved as a nontraditional online course.]

**IE 692 Var [1-3]. International Education Seminar, change to:** Spring Semester 2014

**IE 692 Var[1-3]. International Education Seminar. F, S, SS. Prerequisite:**  
 Graduate standing.

Topics in international education. (NT-O)

[Approved as a nontraditional online course.]

**LITA 200 03(3-0-0). Second-Year Italian I, change to:** Spring Semester 2014

**LITA 200 03(3-0-0). Second-Year Italian I. F, S. Prerequisite:** LITA 107 or placement exam. Credit not allowed for both LITA 200 and LITA 228A.

Grammar review and extensive practice in conversation, reading and writing.

[Approved as an All University Core Curriculum (core) category 3B course.]

**LITA 201 03(3-0-0). Second-Year Italian II, change to:** Spring Semester 2014

**LITA 201 03(3-0-0). Second-Year Italian II. F, S. Prerequisite:** LITA 200 or placement exam.

Grammar review and extensive practice in conversation, reading and writing.

[Approved as an All University Core Curriculum (core) category 3B course.]

**LRUS 200 03(3-0-0). Second-Year Russian I, change to:** Spring Semester 2014

**LRUS 200 04(4-0-0). Second-Year Russian I. F, S. Prerequisite:** LRUS 107 or

placement exam. Credit not allowed for both LRUS 200 and LRUS 228A.  
Grammar review and extensive practice in conversation, reading and writing.

LRUS 201 03(3-0-0). Second-Year Russian II, **change to:** Spring Semester 2014

LRUS 201 04(4-0-0). Second-Year Russian II. F, S. Prerequisite: LRUS 200 or placement exam.

Grammar review and extensive practice in conversation, reading and writing.

PHIL 330/AGRI 330 03(3-0-0). Agricultural Ethics, **change to:** Spring Semester 2014

PHIL 330/AGRI 330 03(3-0-0). Agricultural and Food System Ethics. S. Prerequisite: CO 150. Credit not allowed for both PHIL 330 and AGRI 330.

Basic concepts in ethics and their application to agriculture and the food system.

## New Curricula

College of Health and Human Sciences

School of Education

Effective Fall 2014

Ph.D. in Education and Human Resource Studies

Specialization in Education Sciences

(The entire program is shown.)

<u>Course</u>	<u>Title</u>	<u>Cr</u>
<b>RESEARCH CORE</b>		
EDRM 700 <sup>P</sup>	Quantitative Research Methods	3
EDRM 701 <sup>P</sup>	Applied Linear Models-Educational Research	3
EDRM 702	Foundations of Educational Research	3
EDRM 704 <sup>P</sup>	Qualitative Research	3
EDRM 705 <sup>P</sup>	Qualitative Data Analysis	3
EDRM 706 <sup>P</sup>	Analysis of Variance-Education Research	3
EDRM 707 <sup>P</sup>	Quantitative Data Collection Methods/Analysis	3
EDRM 792A	Seminar: Research Methodology	3
<b>OR</b>		
EDRM 792B	Seminar: Proposal Development	3
EDRM ***	Selected Electives <sup>1</sup>	3
	<u>TOTAL</u>	<u>27</u>
<b>DISSERTATION</b>		
EDRM 799	Dissertation	6-12
	<u>TOTAL</u>	<u>6-12</u>
<b>EDUCATION SCIENCES CORE</b>		
EDUC 713 <sup>P</sup>	Teaching, Learning, and Professional Growth	3
EDUC 715 <sup>P</sup>	Critical Issues for Special Populations	3
EDUC 720 <sup>P</sup>	Human Learning, Cognition, and Motivation	3
	Education and/or Social Science Electives <sup>1</sup>	9
	<u>TOTAL</u>	<u>18</u>
<b>EDUCATION SCIENCES COGNATE</b>		
	Cognate Courses	6-12
	<u>TOTAL</u>	<u>6-12</u>
<b>PROGRAM TOTAL = minimum 63 credits</b>		

<sup>1</sup> This course has at least one prerequisite. Check the Courses of Instruction section of the catalog at <http://catalog.colostate.edu/> to see the course prerequisites.

<sup>1</sup> Select courses with approval of graduate advisor and committee.

### **Request to Add a Specialization in Education Sciences under the Ph.D. in Education and Human Resource Studies**

A request by the School of Education to add a specialization in Education Sciences under the Ph.D. in Education and Human Resource Studies was approved. The recommended effective date, subject to approval by Faculty Council, is Fall Semester 2014.

### **Request to Drop Specializations under the Ph.D. in Education and Human Resource Studies**

A request by the School of Education to drop the following specializations under the Ph.D. in Education and Human Resource Studies was approved:

Interdisciplinary Studies Specialization  
Learning, Teaching, and Culture Specialization  
Research Methodology Specialization.

The recommended effective date, subject to approval by Faculty Council, Fall Semester 2015.

### **Request to Offer Experimental Course a Third Time**

A request to offer experimental course ANEQ 380A2, Companion Animal Science and Management, was approved. The effective date will be Spring Semester 2014.

### **DCE signatures on Distance/Hybrid Course Submissions**

The committee unanimously agreed that a Division of Continuing Education (DCE) signature is no longer required on the Nontraditional Course form. Obtaining the added signature creates an unnecessary delay administering distance delivery courses. New procedures will be created to notify DCE distance delivered courses have been approved by UCC.

The meeting adjourned at 5:10 p.m.

(FC) 9/27/13

Carole Makela, Chair  
Tom Hoehn, Secretary



A regular meeting of the University Curriculum Committee was held on September 27, 2013, at 2:00 p.m.

Members present: Chair Carole Makela, Professors Bradley Goetz, Gretchen Casterella for Paul Mallette, Patrick Fitzhorn, Nancy Jianakoplos, Doug Rideout for Paul Meiman, Steve Strauss, Howard Ramsdell, Michelle Wilde, graduate representative Andrew Bondi, and Kathleen Pickering (ex-officio).

Absent: Sam Guinn.

Guests: Fionna Bright, Kelley Brundage, Carrie Middleton, and Linda Selkirk

## Minutes

The minutes of September 20, 2013, were approved.

## Experimental Course Report

The Experimental Course report was received.

## Consent Agenda

The Consent Agenda was approved.

## CURRICULAR REQUESTS

\* Course is offered for term specified in even-numbered years.

+Course requires field trips.

NT-O, offered as nontraditional, online course.

The following curricular requests were approved.

### New Courses

### Effective Date

**ANTH 343 03(3-0-0). Applied Medical Anthropology.** F, S, SS. Prerequisite: ANTH 100 or ANTH 200. Spring Semester 2014

How and why we get sick and what sickness means from biological, social, and cultural perspectives. (NT-O)

[Approved as a new traditional and new nontraditional online course.]

**ATS 607 03(2-3-0). Computational Methods for Atmospheric Science.** S. Spring Semester 2014  
Prerequisite: ATS 601 or concurrent registration.

Computer programming tools unique to and common in the atmospheric sciences.

**ATS 693 01(0-0-1). Responsible Research in Atmospheric Science.** S. Spring Semester 2014  
Prerequisite: Must be admitted to an Atmospheric Science degree program.

Scientific misconduct; ethical publishing; record keeping; data management; professional skills applicable to atmospheric science.

**BC 521/CHEM 521 03(3-0-0). Principles of Chemical Biology.** F. Prerequisite: CHEM 245 or CHEM 343 or CHEM 346. Credit not allowed for both BC 521 and CHEM 521. Fall Semester 2014

Principles of chemical biology. Chemical methods for understanding and controlling the structure and function of biopolymers.

**CHEM 521/BC 521 03(3-0-0). Principles of Chemical Biology.** F. Prerequisite: Fall Semester 2014  
CHEM 245 or CHEM 343 or CHEM 346. Credit not allowed for both CHEM 521 and BC 521.

Principles of chemical biology. Chemical methods for understanding and controlling the structure and function of biopolymers.

**E 638 03(3-0-0). Assessment of English Language Learners.** F, S. Prerequisite: Spring Semester 2014  
E514; E527.

Theory, practice, and professional conduct in the assessment of English language learners.

**JTC 416 03(3-0-0). New Communication Technologies in the U.S.** SS. Summer Semester 2014  
Prerequisite: Written consent of instructor.

Broad-based survey of evolving and emergent communication technologies in the United States.

**POLS 364 03(3-0-0). U.S. Energy Policy Analysis.** F, S, SS. Prerequisite: Spring Semester 2014  
POLS 101.

Discussion and analysis of energy use and its impact on the economy and environment with an emphasis on future policy. (NT-O)

[Approved as a new traditional and new nontraditional online course.]

**POLS 451 03(3-0-0). Public Policy Design and Governance.** S. Prerequisite: Spring Semester 2014  
POLS 101 or POLS 103; junior standing.

Examination of governance institutions outside the scope of traditional bureaucratic organizations and accountability.

**PBHL 516 02(2-0-0). Public Health Foundations.** F. Prerequisite: Graduate Summer Semester 2014  
standing; Colorado School of Public Health student. Credit not allowed for both PBHL 516 and PSY 516A-C.

Introduction to public health history, concepts, principles, and current trends.

**PBHL 686 02(0-0-2). Public Health Practicum.** F, S, SS. Prerequisite: Spring Semester 2014  
Admission to Master of Public Health Program.

**PBHL 695 Var[1-6]. Public Health Independent Study.** F, S, SS. Prerequisite: Spring Semester 2014  
Graduate standing; Colorado School of Public Health student. May be taken for credit up to 3 times; maximum of 9 credits allowed.

**VM 612 01(0-0-1). The Healer's Art.** S. Prerequisite: Enrollment in the Spring Semester 2014  
Professional Veterinary Medicine program.

Exploration of student experiences, beliefs, and values related to their work as veterinary medical professionals.

## Major Change to Courses

## Effective Date

**ANTH 479/IE 479 03(3-0-0). International Development Theory and Practice,** Spring Semester 2014  
**change to:**

**ANTH 479/IE 479 03(3-0-0). International Development Theory and Practice.** F. Prerequisite: Junior or senior standing. Credit not allowed for both ANTH 479 and IE 479.

Contemporary issues in international community and economic development,

with practical and theoretical analysis from interdisciplinary perspectives.

[Approved as an All-University Core Curriculum (AUCC) category 4A course for the major in Anthropology.]

**ANTH 493 01(0-0-1). Capstone Seminar, change to:**

Spring Semester 2014

**ANTH 493 01(0-0-1). Capstone.** F, S, SS. Prerequisite: Concurrent registration in a 4A course (see department list).

Linkages between anthropological subfields and how professional anthropologists approach issues. (NT-O)

[Approved as a nontraditional online course.]

**AREC 224 01(0-0-1). Introduction to Agribusiness Entrepreneurship, change to:**

Spring Semester 2014

**+AREC 224 01(0-0-1). Introduction to Agribusiness Entrepreneurship.** F. Prerequisite: AREC 202 or concurrent registration or ECON 202 or concurrent registration. Field trips required.

[Approved as a nontraditional online course.]

**AREC 487 Var. Internship, change to:**

Spring Semester 2014

**AREC 487 Var. Internship.** F, S, SS. Prerequisite: None. May be taken for a maximum of 6 credits. (NT-O)

[Approved as a nontraditional online course.]

**AREC 495 Var. Independent Study, change to:**

Spring Semester 2014

**AREC 495 Var. Independent Study.** F, S, SS. Prerequisite: None. May be taken for a maximum of 6 credits. (NT-O)

[Approved as a nontraditional online course.]

**\*BZ 505 03(3-0-0). Cognitive Ecology, change to:**

Spring Semester 2014

**\*BZ 505 03(3-0-0). Cognitive Ecology.** S (even). Prerequisite: BZ 300.

The evolutionary ecology of mechanisms related to information processing and decision-making in animals.

**IE 479/ANTH 479 03(3-0-0). International Development Theory and Practice, change to:**

Spring Semester 2014

**IE 479/ANTH 479 03(3-0-0). International Development Theory and Practice.** F. Prerequisite: Junior or senior standing. Credit not allowed for both IE 479 and ANTH 479.

Contemporary issues in international community and economic development, with practical and theoretical analysis from interdisciplinary perspectives.

[Approved as an All-University Core Curriculum (AUCC) category 4A course for the major in Anthropology.]

**\*JTC 460 03(3-0-0). Senior Capstone, change to:**

Spring Semester 2014

**JTC 460 03(3-0-0). Senior Capstone.** F, S. Prerequisite: JTC 326; 27 additional

credits of JTC.

Integration and reflection for seniors with a career component that will prepare them for the job market. (NT-O)

[Approved as a nontraditional online course.]

**POLS 460 03(3-0-0). Public Policy Process, change to:**

Spring Semester 2014

**POLS 460 03(3-0-0). Public Policy Process. F, S. Prerequisite: POLS 101; junior standing.**

Explanations of U.S. policy formation, implementation, and impact. (NT-O)

[Approved as a nontraditional online course.]

The meeting adjourned at 5:05 p.m.

(FC) 10/4/13

Carole Makela, Chair  
Tom Hoehn, Secretary

A regular meeting of the University Curriculum Committee was held on October 4, 2013, at 2:00 p.m.

Members present: Chair Carole Makela, Professors Bradley Goetz, Paul Mallette, Patrick Fitzhorn, Nancy Jianakoplos, Paul Meiman, Steve Strauss, Howard Ramsdell, Michelle Wilde, graduate representative Andrew Bondi, undergraduate representative Sam Guinn, and Kathleen Pickering (ex-officio).

Guests: Fionna Bright, Kelley Brundage, Paul Kennedy, Carrie Middleton, Ben Reynolds, and Linda Selkirk

## Minutes

The minutes of September 27, 2013, were approved.

## Experimental Course Report

The Experimental Course report was received.

## Consent Agenda

The Consent Agenda was approved.

## CURRICULAR REQUESTS

\* Course is offered for term specified in even-numbered years.

+Course requires field trips.

NT-O, offered as nontraditional, online course.

The following curricular requests were approved.

### New Courses

### Effective Date

**ANTH 313 03(3-0-0). Modernization and Development.** F, S, SS. Prerequisite: ANTH 100 or ANTH 200. Spring Semester 2014

Processes by which cultures change and modernize, 1989 to the present.  
(NT-O)

[Approved as a new traditional and new nontraditional online course.]

**+BMS 400 01(0-0-1). Neuroanatomy Through Clinical Case Studies.** S. Spring Semester 2014  
Prerequisite: BMS 345 or concurrent registration; Biomedical Sciences majors only. Required field trips.

Neuroanatomical case studies to reinforce and apply information gained in BMS 345, Functional Neuroanatomy.

[Approved as an All-University Core Curriculum (AUCC) categories 4A and 4C course for the Biomedical Sciences major.]

**CHEM 555 03(3-0-0). Chemistry of Sustainability.** F. Prerequisite: BC 411 or CBE 310 or CHEM 476; CHEM 343 or CHEM 346. Spring Semester 2014

The central role of chemistry for achieving sustainability in key areas including chemicals and materials, energy, and environment.

**CM 700 01(0-0-1). Critical Analysis of Scientific Literature.** F, S. Fall Semester 2014  
Prerequisite: BC 565; CM 510. May be repeated for a maximum of 4 credits.

Presentation and discussion of current literature of cell and molecular biology. Content varies each semester to include the major focus groups.

**ERHS 503 01(1-0-0). Toxicology Principles.** S. Prerequisite: CHEM 113; LIFE 102; credit not allowed for both ERHS 502 and ERHS 503. This is a partial-semester course. Spring Semester 2014

Principles of toxicology for applications in industrial hygiene and environmental public health.

**ERHS 504 02(2-0-0). Occupational and Environmental Toxicology.** S. Prerequisite: ERHS 502 or (ERHS 503 or concurrent registration) or ERHS 446. This is a partial-semester course. Spring Semester 2014

Toxic effects of harmful agents found in occupational and environmental settings.

**ERHS 546 02(2-0-0). Environmental Exposure Assessment.** S. Prerequisite: CHEM 113. Spring Semester 2014

Approaches and techniques for quantitative characterization of environmental exposure to harmful agents via inhalation, ingestion and dermal pathways.

**ESS 487 Var[1-6]. Internship.** F, S, SS. Prerequisite: Written consent of instructor. Spring Semester 2014

Supervised work experience in professional settings related to Ecosystem Science and Sustainability.

**GR 415 03(3-0-0). The Geography of Commodities.** F, S, SS. Prerequisite: GR 100. Spring Semester 2014

Social relations, international trade, and environmental impacts surrounding the production, transportation, exchange and consumption of commodities.

**MECH 425 04(3-2-0). Mechanical Engineering Vibrations.** S. Prerequisite: MECH 324. Spring Semester 2014

Vibrations applied to rotating machinery and structures. SDOF and MDOF systems, mode shapes, vibration measurements and control. Hands-on lab.

**\*MIP 675 03(3-0-0). Advanced Bioanalytic Pathology.** S. Prerequisite: (VM 724; written consent of instructor) or D.V.M. degree. Spring Semester 2014

Laboratory medicine for post graduate veterinarians and professional veterinary medical students.

**OT 676 03(3-0-0). Pathokinesiologial Conditions and Assessment.** S. Prerequisite: OT 450. Spring Semester 2014

Various musculoskeletal imbalances and injuries that present as difficulties in function and participation in every-day activity.

**PHIL 104/ANEQ 104 03(3-0-0). Values, Culture, and Food Animal Agriculture.** S. Prerequisite: Non-Animal Science majors with a freshman or sophomore standing. Credit not allowed for both PHIL 104 and ANEQ 104. Spring Semester 2014

Evolution of the social values and cultural understandings shaping modern animal agriculture; current problems in animal agriculture.

**POLS 465 03(3-0-0). Public Policy Analysis.** F, S, SS. Prerequisite: POLS 101; completion of AUCC category2; junior standing. Spring Semester 2014

Methods and tools used in the practice of policy analysis and evaluation of current public policy; emphasis on applied analysis.

**SOWK 675 03(2-0-1). Psychopathology and Social Work.** S, SS. Prerequisite: M.S.W. degree or current enrollment in an M.S.W. program. Spring Semester 2014

Major forms of mental and emotional disorders and methods of diagnosis relevant to social work practice with individuals and families. (NT-O)

[Approved as a new nontraditional online-only course.]

**SPCM 356 03(2-3-0). Asians in the U.S. Media.** S. Prerequisite: SPCM 342 or SPCM 350 or concurrent registration. Spring Semester 2014

Asian representations in the U.S. media from the 19<sup>th</sup> century to the present.

**SPCM 358 03(2-3-0). Gender and Genre in Film.** S. Prerequisite: SPCM 350 or concurrent registration. Spring Semester 2014

Gender relations in film genres.

### Major Change to Courses

### Effective Date

**ANEQ 100 03(3-0-0). History of Food Animal Agriculture, change to:**

Spring Semester 2014

**ANEQ 104/PHIL 104 03(3-0-0). Values, Culture, and Food Animal Agriculture.** S. Prerequisite: Non-Animal Science majors with a freshman or sophomore standing. Credit not allowed for both ANEQ 104 and PHIL 104.

Evolution of the social values and cultural understandings shaping modern animal agriculture; current problems in animal agriculture.

**\*ANEQ 448/SOCR 448 03(2-2-0). Livestock Manure Management and Environment, change to:** Spring Semester 2014

**\*+ANEQ 448 03(2-2-0). Livestock Manure Management and Environment.** F. Prerequisite: Three credits 100-level chemistry. Credit allowed for only one of the following courses: ANEQ 448, ANEQ 548, SOCR 448, SOCR 548. Field trips required.

Manure management; maximizing benefits to soils and crops; minimizing air and water quality hazards; complying with regulations.

**\*ANEQ 548/SOCR 548 04(2-2-1). Issues in Manure Management, change to:** Spring Semester 2014

**\*+ANEQ 548 04(2-2-1). Issues in Manure Management.** F. Prerequisite: Three credits 100-level chemistry. Credit allowed for only one of the following courses: ANEQ 448, ANEQ 548, SOCR 448, SOCR 548. Field trips required.

Manure management practices maximizing benefits to soils and crops while minimizing hazards to air and water quality and complying with regulations.

**ANTH 473 03(2-0-1). The Neandertals, change to:**

Spring Semester 2014

**ANTH 473 03(2-0-1). The Neandertals.** S. Prerequisite: ANTH 120 or BZ 110; ANTH 372 or ANTH 373 or ANTH 374 or ANTH 375 or ANTH 376.

Socio-historical foundations of questions regarding Neandertal paleobiology and culture and the Neandertal role in the evolution of Homo sapiens.

[Approved as an All-University Core Curriculum (AUCC) category 4A course for the Anthropology major.]

**AREC 660 03(3-0-0). Economics of Agricultural Development, change to:**

Spring Semester 2014

**AREC 660 03(3-0-0). Development of Rural Resource-Based Economics.** S. Prerequisite: AREC 506.

Economic literature-based exploration of human welfare measures and implications of approaches to agriculture and resource-based economic development.

**BMS 345 04(3-2-0). Functional Neuroanatomy, change to:** Spring Semester 2014

**BMS 345 04(3-2-0). Functional Neuroanatomy.** F, S. Prerequisite: BMS 300 or BMS 360.

Functional systems and circuits of the human brain and spinal cord.

[Approved as an All-University Core Curriculum (AUCC) category 4B course for the Biomedical Sciences major.]

**CHEM 104 01(0-2-0). Chemistry in Context Laboratory, change to:** Spring Semester 2014

**CHEM 104 01(0-2-0). Chemistry in Context Laboratory.** F, S, SS. Prerequisite: CHEM 103 or concurrent registration.

Laboratory applications of principles covered in CHEM 103. (NT-O)

[Approved as a nontraditional online course.]

**CIVE 573 03(2-2-0). Urban Stormwater Management, change to:** Spring Semester 2014

**\*CIVE 573 03(3-0-0). Urban Stormwater Management.** S. Prerequisite: CIVE 322/ENVE 322; CIVE 401.

Effects of urbanization on watershed hydrology and receiving waters; control practices to mitigate effects using mathematical models. (NT-O)

[Approved as a nontraditional online course.]

**ECE 465 02(2-0-0). Electrical Energy Generation Technologies, change to:** Spring Semester 2014

**ECE 465 03(3-0-0). Electrical Energy Generation Technologies.** S. Prerequisite: ECE 202 with a C- or better.

Various electrical energy generation alternatives. Comparisons based on cost, reliability, availability and environmental impact. (NT-O)

[Approved as a nontraditional online course.]

**ECE 471 03(3-0-0). Semiconductor Devices, change to:** Spring Semester 2014

**ECE 471A 01(1-0-0). Semiconductor Physics.** S. Prerequisite: MATH 340 or MATH 345; PH 142. Credit not allowed for both ECE 471A and ECE 471. This is a partial-semester course.

Fundamentals of semiconductor electron, hole states and motion: bandgap, effective mass, carrier density, Fermi level, doping, drift and diffusion.

[Approved to include dropping the nontraditional online format.]

**ECE 574 03(3-0-0). Optical Materials and Devices, change to:** Spring Semester 2014

**ECE 574 03(3-0-0). Optical Properties in Solids.** S. Prerequisite: ECE 441 with a C- or better.

Light propagation and interaction with materials; linear and non-linear optical properties.



**EDUC 530 02(1-2-0). Computer Applications in Effective Instruction, change to:** Spring Semester 2014

**EDUC 530 03(2-2-0). Technology Enhanced Learning.** F, SS. Prerequisite: Bachelor's degree.

Enhancing instruction and learning through the effective use of technology. (NT-O)

[Approved as a nontraditional online course.]

**ERHS 566 03(3-0-0). Clinical and Forensic Toxicology, change to:** Spring Semester 2014

**ERHS 566 03(2-2-0). Forensic Toxicology.** S. Prerequisite: CHEM 245 or CHEM 343 or CHEM 346.

Toxic effects of commonly encountered abused substances and laboratory methods to identify and measure these.

**ESS 400 04(2-0-2). Sustainability and Ecosystem Science, change to:** Spring Semester 2014

**ESS 400 03(2-0-1). Sustainability and Ecosystem Science.** S. Prerequisite: ESS 311; ESS 330.

Integrates ecosystems services and sustainability strategies, application to coupled natural and human systems.

**GEOL 250 03(3-0-0). The Solid Earth, change to:** Spring Semester 2014

**GEOL 250 03(2-2-0). The Solid Earth.** S. Prerequisite: GEOL 120 or GEOL 122 or GEOL 124 or GEOL 150; MATH 124; MATH 125.

Structure, flow, and composition of the deep Earth; introduction to geophysics; tests of plate tectonic theory.

**LIFE 205 03(3-0-0). Survey of Microbial Biology, change to:** Spring Semester 2014

**LIFE 205 03(3-0-0). Microbial Biology.** S. Prerequisite: (BZ 110; BZ 111) or LIFE 102; CHEM 107 or CHEM 111.

General principles of microbiology focused on human-microbial interactions.

**MATH 117 01(1-0-0). College Algebra in Context I, change to:** Spring Semester 2014

**MATH 117 01(1-0-0). College Algebra in Context I.** F, S, SS. Prerequisite: Mathematics Placement Examination or Mathematics Challenge Examination.

Functions as mathematical models. Linear, quadratic, and polynomial functions considered symbolically, graphically, numerically, and contextually. (NT-O)

[Approved as a nontraditional online course.]

**MU 543 03(3-0-0). Advanced Research Methods in Music Therapy, change to:** Spring Semester 2014

**MU 543 03(3-0-0). Advanced Research Methods in Music Therapy.** S. Prerequisite: MU 241; MU 250.

Research techniques used in measuring and recording behavior. Advanced methods used in music therapy research. (NT-O)

[Approved as a nontraditional online course.]

RRM 487 Var [1-15]. Internship: Restaurant and Resort Management, **change** Spring Semester 2014  
to:

**RRM 487 03(0-0-9). Internship: Hospitality Management.** F, S, SS.  
Prerequisite: RRM 200; RRM 311 or concurrent registration; junior standing.

SPCM 357 03(2-3-0). Film and Social Change, **change to:** Spring Semester 2014

**SPCM 357 03(2-3-0). Film and Social Change.** F, S, SS. Prerequisite: SPCM 350 or concurrent registration.

Ways in which the medium of motion pictures has sparked significant social changes at home and abroad. (NT-O)

[Approved as a nontraditional online course.]

## New Curricula

College of Liberal Arts  
Department of English  
Master of Arts in English (Plan A)  
Specialization in TESL/TEFL

Effective Spring 2014

(The entire program is shown.)

<u>Course</u>	<u>Title</u>	<u>Cr</u>
E 514	Phonology/Morphology—ESL/EFL	3
E 515	Syntax for ESL/EFL	3
E 526	Teaching English as Foreign/Second Language	3
E 527 <sup>P</sup>	Theories of Foreign/Second Language Learning	3
E 638 <sup>P</sup>	Assessment of English Language Learners	3
E 684B	Supervised College Teaching	2
	Additional graduate credits <sup>1</sup>	11
	<u>TOTAL</u>	<u>28</u>
<b>THESIS</b>		
E 699	Thesis	3
	<u>TOTAL</u>	<u>3</u>
<b>PROGRAM TOTAL = minimum 31 credits</b>		

<sup>P</sup> This course has at least one prerequisite. Check the Courses of Instruction section of the catalog at <http://catalog.colostate.edu/> to see the course prerequisites.

<sup>1</sup> A course in research methods in English is highly recommended. Select courses with approval of advisor and graduate committee.

Master of Arts in English (Plan B)  
Specialization in TESL/TEFL

Effective Spring 2014

(The entire program is shown.)

<u>Course</u>	<u>Title</u>	<u>Cr</u>
E 514	Phonology/Morphology—ESL/EFL	3

<u>Course</u>	<u>Title</u>	<u>Cr</u>
E 515	Syntax for ESL/EFL	3
E 526	Teaching English as Foreign/Second Language	3
E 527 <sup>p</sup>	Theories of Foreign/Second Language Learning	3
E 638 <sup>p</sup>	Assessment of English Language Learners	3
E 684B	Supervised College Teaching	2
	Additional graduate credits <sup>1</sup>	13
	<u>TOTAL</u>	<u>30</u>
<b>INDEPENDENT STUDY</b>		
E 694	Independent Study: Portfolio	3
	<b>OR</b>	
E 698	Research: Project	3
	<u>TOTAL</u>	<u>3</u>
<b>PROGRAM TOTAL = minimum 33 credits</b>		

<sup>p</sup> This course has at least one prerequisite. Check the Courses of Instruction section of the catalog at <http://catalog.colostate.edu/> to see the course prerequisites.

<sup>1</sup> A course in research methods in English is highly recommended. Select courses with approval of advisor and graduate committee.

### **Request to add a Specialization in TESL/TEFL under the Master of Arts in English**

A request by the Department of English to add a specialization in TESL/TEFL under the Master of Arts in English (Plans A and B) was approved. The recommended effective date, subject to approval by Faculty Council, is Spring Semester 2014.

The meeting adjourned at 5:35 p.m.

(FC) 10/11/13

Carole Makela, Chair  
Tom Hoehn, Secretary

September 12, 2013

TO: Tim Gallagher, Chair  
Executive Committee and Faculty Council

FROM: Carole Makela, Chair  
University Curriculum Committee

SUBJECT: Request for new major in Neuroscience, B.S.

The University Curriculum Committee moves Faculty Council adopt the following:

**A new major in Neuroscience (B.S.) with concentrations in Behavioral and Cognitive Neuroscience and Cell and Molecular Neuroscience be established effective Fall Semester 2014.**

The Molecular, Cellular & Integrative Neuroscience (M.C.I.N.) Special Academic Unit proposed a major in Neurosciences. This new degree, pending approval of the Board of Governors and CCHE, would be effective Fall Semester 2014.

The proposal was reviewed and approved by University Curriculum Committee (UCC) on September 6, 2013.

Rationale:

From the Phase I document, "...In the Rocky Mountain region, only private colleges and universities (Colorado College, Regis University, BYU) offer such a program, giving Colorado State University the opportunity to provide the only such regional program at a state-supported research university....The major will serve students who wish to pursue advanced degrees, attend professional schools or be well trained for research positions.... The national reputation of the graduate program and research faculty should add to our ability to recruit out-of-state students. The program would also offer an additional high quality and rigorous option to the popular Biomedical Sciences degree program, which has reached its enrollment cap."

Enclosures

xc Carole Makela

Approved By Council of Deans, 3/10/10 (curriculum changes 7/10/13), Rev. 7/10/13

## PHASE 1

### Proposal for New Undergraduate Degree Program in Neurosciences

Submitted by James R. Bamberg on behalf of the Neuroscience Faculty

#### 1. Brief Overview of Proposed Program

- *Name of Major/Program:* Undergraduate Major in Neuroscience (two concentrations)
- *Degree type (BA, BS, MA, MS, PHD...)* B.S.
- *Department/School:* Interdisciplinary
- *Special Academic Unit:* The program will be administered by the Molecular, Cellular and Integrative Neurosciences Program (MCIN), a university approved Special Academic Unit (SAU), which will provide undergraduate research opportunities and participate in curriculum development through representatives to the curriculum committees of the College of Natural Sciences and the College of Veterinary Medicine and Biomedical Sciences. The SAU is housed in the Provosts Office and is directed by a faculty member elected by MCIN faculty, who reports to an Administrative Oversight Committee (AOC) composed of the Vice Provost for Graduate Affairs, the dean of the College of Natural Sciences and the dean of the College of Veterinary Medicine and Biomedical Sciences. Upon approval of the undergraduate major, the Vice Provost for Undergraduate Affairs will join this AOC. Future Directors will be proposed by MCIN according to provisions of the MCIN code and will require approval of the AOC for appointment.
- *Expected total number of students enrolled in program (five years post-implementation):* 200
- *Summary of Program and Rationale:* The first undergraduate major granting a degree in neuroscience was initiated in 1973 at the University of Rochester, NY. Since then, about 62 colleges and universities have established such programs. In the Rocky Mountain region, only private colleges and universities (Colorado College, Regis University, BYU) offer such a program, giving Colorado State University the opportunity to provide the only such regional program at a State-supported research university. We are proposing an undergraduate major in Neuroscience with two concentrations, Behavioral and Cognitive Neuroscience (BCN) and Cell and Molecular Neuroscience (CMN). These two areas represent the major divisions within neuroscience, the former accommodating the interests of many psychology majors and the latter accommodating the interests of many biomedical-oriented students. However, it is our contention that the future of the discipline of neuroscience requires individuals well trained in the basics from both areas and as such we have put together a rigorous two year core curriculum along with several upper division courses that will serve both areas, as well as some concentration specific courses. The major will serve students who wish to pursue advanced degrees, attend professional schools or be well trained for research positions.

We take advantage of the strong life science core curriculum to provide the introduction to general biology and the molecular biosciences (genetics and cell biology) along with an introductory course in psychology that satisfies AUCC category 3C. Both concentrations require a full year of organic chemistry and one semester of physics and calculus and a second psychology course on Brain, Mind and Behavior that along with the remaining AUCC requirements, round out the first two years. Both concentrations also require a cellular neurobiology course, human physiology, functional neuroanatomy, statistics, freshman and senior seminars, and at least one semester of biochemistry. The CMN concentration requires second semesters of calculus, physics and biochemistry (plus lab), general microbiology and immunology, and an advanced course in molecular regulation of cell function, allowing room for about 9 free elective credits. The BCN concentration requires upper division courses in cognitive psychology, sensory perception and physiological psychology plus 10 elective credits. Both concentrations also require a thesis preparation class (NB 399) and a senior thesis (NB 499), either based on original undergraduate research or on the scientific literature. Both concentrations require one elective

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course from an approved list of upper division courses. The proposed curriculum for this major with concentrations in Behavioral and Cognitive Neuroscience (BCN) and Cell and Molecular Neurosciences (CMN) is shown on Page 3.

The program will be housed in the Provosts Office and administered by the MCIN program. The undergraduate degree program will be directed by the Associate Director of Undergraduate Affairs (ADUA), a faculty member, elected by MCIN faculty, who will report to the MCIN Director and an Administrative Oversight Committee (AOC) composed of the Vice Provost for Undergraduate Affairs, the Vice Provost for Graduate Affairs, the dean of the College of Natural Sciences and the dean of the College of Veterinary Medicine and Biomedical Sciences, all with equal voting rights. The MCIN Program currently has 27 active regular tenured or tenure-track faculty members, who come from ten departments (Biochemistry and Molecular Biology; Biology; Biomedical Sciences; Chemical and Biological Engineering; Computer Sciences; Environmental and Radiological Health Sciences; Microbiology, Immunology and Pathology; Music Theater and Dance; Occupational Therapy; and Psychology) in five colleges (Engineering, Health and Human Sciences, Liberal Arts, Natural Sciences and Veterinary Medicine and Biomedical Sciences). Over 80% of the faculty members are from the Colleges of Natural Sciences and Veterinary Medicine and Biomedical Sciences. The MCIN program has been a designated Program of Research and Scholarly Excellence since the inception of PRSE programs in 1992. The addition of the Vice Provost for Undergraduate Affairs to the Administrative Oversight Committee and administering the undergraduate degree through the AOC is consistent with the mechanism established for SAU operations. This proposed B.S. degree program is very rigorous and is likely to be attractive to a small group (~200 students) of academically well-prepared undergraduates.

Although there is no undergraduate neuroscience major in any public institution in the Rocky Mountain region, both CSU and CU Boulder have been considering such offerings for a few years. Colorado State University currently teaches virtually all of the coursework required for establishing this major (see page 3). In putting together the required courses for research, thesis and seminar, we utilize the approved NB subject code approved for MCIN courses. The NB rubric is used for graduate courses administered through MCIN and we suggest that this rubric be used as well for new undergraduate courses administered through MCIN. Courses designated for using competencies (Cat. 4A) are NB 499 (senior thesis) in both concentrations and PSY 459 (cognitive neuroscience lab) (BCN) and BC 401 (general biochemistry I) (CMN). Courses designated for building foundations (Cat. 4B) are PSY 458 (cognitive neuroscience) and PSY 456 (sensation and perception) (BCN) and BC 403 (general biochemistry II) (CMN). Capstone courses (Cat.4C) are NB 493 (senior seminar) and NB 499 (senior thesis) for both concentrations. Participation in undergraduate research and a required senior thesis are important components of this major. In fact, the emphasis on experiential learning through the thesis should prove attractive to the very best students, both from Colorado and from surrounding states, who have no public university option for a neuroscience degree. Thus, in the long-term this major could benefit CSU, especially in times of economic hardship. The national reputation of the graduate program and research faculty should add to our ability to recruit out-of-state students. The program would also offer an additional high quality and rigorous option to the popular Biomedical Sciences degree program, which has reached its enrollment cap.

#### **Comparison of Neuroscience Major with Other Majors**

There is very little overlap in the first two year core courses between the psychology major and the proposed BCN concentration in neuroscience because of the more stringent basic science requirements for the neuroscience major. However, neuroscience majors will be able to fulfill the requirements for the psychology major with an appropriate selection of courses to provide the additional 27 credits. The opposite is not true because most psychology majors do not take the prerequisites to complete the upper division courses required by the neuroscience major outside of psychology (less than 20% course overlap outside of AUCC requirements). There are also major differences between the proposed CMN concentration and the existing majors in both Biochemistry and Biomedical Sciences, the two majors that

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are the closest in requirements. Below is a comparison of the proposed courses required for Neuroscience CMN concentration with courses required in Biochemistry and Biomedical Sciences degrees:

**Biochemistry:**

Excluding the freshmen and senior seminars, and the senior thesis courses (each of which has an equivalent in the Biochemistry major), 25 credits of CMN coursework is not required for the Biochemistry major: PSY 100, PSY 252, BMS 325, BMS 300, BMS 345, NB 399, MIP 300, MIP 342. However, of these courses, one can be taken to meet AUCC requirements (PSY 100), one can be taken to meet an organismal biology elective (BMS 300), and one can be taken to meet the molecular bioscience elective (MIP 300), making the minimum difference here at least 15 credits. In addition, 7 credits of BC major course work are not required for CMN concentration: BC 411, BC 463.

**Biomedical Sciences:**

Excluding senior seminar, which has an equivalent in the BMS major, 36 credits of CMN coursework are not required for BMS major: NB 192, LIFE 203, MATH 255, PSY 100, PSY 252, BC 401, BC 403, BC 404, BMS 345, MIP 342, NB 399, NB 499, BC 465. However, of these courses, one can be taken to meet AUCC requirements (PSY 100), the BC 401, 403, 404 sequence (8 credits) can be used to replace BC 351 (4 credits), and 11 credits (BMS 345, MIP 342 and BC 465) can be used toward the 15 credits of required upper division electives, bringing the minimum difference here to about 18 credits. In addition, 25 credits of BMS course requirements are not required for the CMN concentration: BMS 260, BMS 302, BMS 360, BMS 301, BMS 301/305 or 330, BMS 460, BMS 492, and MIP 302. However, BMS 300 and BMS 360 are nearly interchangeable, reducing the difference to 21 credits.

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Interdisciplinary BS degree in Neuroscience with two concentrations (Courses in black regular font are for both concentrations; *courses specific to the Cell and Molecular Neuroscience (CMN) concentration are in red italic font*; courses specific to the Behavioral and Cognitive Neuroscience (BCN) concentration are in green bold font.

### Freshman

Fall			Spring		
NB 192	Introductory Sem	1	LIFE 201B	Intro Genetics	3
LIFE 102	Attrib. of Living Sys.	4	LIFE 203	Genetics Lab	2
CHEM 111	Gen Chem I	4	CHEM 113	Gen Chem II	3
CHEM 112	Gen Chem Lab I	1	CHEM 114	Gen Chem Lab II	1
MATH 155	Calculus I	4	PSY 100	Gen. Psychology	3
CO150	Composition	3	AUCC	cat 2A/3B,D,E	3
		17			15

### Sophomore

Fall			Spring		
CHEM 341	Mod.Org Chem I	3	CHEM 343	Mod. Org Chem II	3
LIFE 210	Intro Euk Cell Biol	3	CHEM 344	Mod. Org Chem Lab	2
LIFE 212	Euk Cell Biol Lab	2	PH 121/141	Physics I	5
AUCC	cat2/3B,D,E	3	AUCC	cat 2/3B,D,E	3
MATH 255	Calc. for Bio Sci	4	PSY 252	Mind, Brain, Behavior	3
PSY 250	Res. Meth. Psych.	4			16
		15			

### Junior

Fall			Spring		
BMS 300	Princ Hum. Physiol.	4	BMS 345	Funct. Neuroanat.	4
STAT 301/07	Statistics	3	BC 403 <sup>2</sup>	Comp. Biochem. II	3
BC 401 <sup>1</sup>	Comp. Biochem.	3	AUCC	cat 2/3B,D,E	6
BC 404	Comp. Biochem Lab	2	AUCC	cat 2/3B,D,E	3
PH 122/142	Physics II	5	BC 351	Princip. of Biochem.	4
PSY 352	Learning & Memory	3	PSY 458 <sup>2</sup>	Cog. Neuroscience	3
OR			PSY 459 <sup>1</sup>	Cog. Neurosci. Lab	2
PSY 452	Cognitive Psych.	3			16/13
AUCC	Cat 2/3B,D,E	3			
		13/17			

### Senior

Fall			Spring		
BMS 325	Cellular Neurobiol	3	NB 499 <sup>1,3</sup>	Thesis	3
NB 399	Thesis Prep.	1	Free Electives		5
NB 493 <sup>3</sup>	Senior Sem.	1	MIP 342	Immunology	4
MIP 300	Intro. Microbiol.	3	BC 465	Mol Reg Cell Fn	3
PSY 454	Biological Psych.	3	PSY 456 <sup>2</sup>	Sens. Percep.	3
PSY 455	Biol. Psych. Lab.	2	PSY 457	Sens. Percep. Lab	2
Free Electives		4	Free Electives		7
Free Electives		3			15/15
		13/12			

BCN has 120 credits (10 free electives); CMN has 120 credits (9 free electives)

<sup>1</sup>Using competencies (4A); <sup>2</sup>Building foundations (4B); <sup>3</sup>Capstone course (4C)

Most students will fill free electives with Independent Study or Undergraduate Research which can total up to a maximum of 10 credits toward the 120 credits required.



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## **2. Fit with CSU Role and Mission and University's Most Current Strategic Plan**

### **• What are the objectives of the program?**

The objectives of the program are to provide a very high quality undergraduate experience that includes experiential learning and a written thesis as measures of a successful outcome. The utilization of the high quality revised LIFE core curriculum along with rigorous courses from chemistry, mathematics, physics and psychology will provide an excellent foundation upon which to build a strong understanding of the molecular and cellular interactions within the nervous system that allows us to understand the brain, mind and behavior. These truly represent some of mankind's most intellectual challenges. Finding solutions to the neurodegenerative diseases of the aged will be a major research focus for improving the quality of our extended lifespan in the 21<sup>st</sup> century.

### **• How does the proposed program support the mission of the University? Refer to State Statute defining role and mission of Colorado State University (see Appendix C).**

The mission of Colorado State University as stated in the revised statutes 23-31-101 is: **Colorado state university** shall be a comprehensive graduate research university with selective admission standards offering a comprehensive array of baccalaureate, masters, and doctoral degree programs. Consistent with the tradition of land grant universities, **Colorado State University** has exclusive authority to offer graduate and undergraduate programs in agriculture, forestry, natural resources, and veterinary medicine.

The mission set forth by the Board of Governors states: Inspired by its land-grant heritage, Colorado State University is committed to excellence, setting the standard for public research universities in teaching, research, service and extension for the benefit of the citizens of Colorado, the United States, and the world.

The proposed major in Neurosciences is in keeping with this mission since it provides a strong undergraduate program that will prepare students for biomedical careers, including veterinary medicine, as well as research careers through access to advanced degrees. The faculty members who will deliver this program, members of MCIN, have already demonstrated excellence in their research by being named a Program of Research and Scholarly Excellence continuously over a 20 year period.

### **• How does the proposed program support the most current University Strategic Plan of the institution? (Taken from: [http://www.president.colostate.edu/strategicplanning/pages/sd\\_march06\\_foreword.aspx](http://www.president.colostate.edu/strategicplanning/pages/sd_march06_foreword.aspx))**

The objectives of the CSU strategic plan related to the new major are: *to assure excellence in academic programs, create distinctive undergraduate experiences, enhance the quality and role of graduate education, foster excellence in research, scholarship and creativity, and focus research in key areas of institutional strength and societal and global needs.* The proposed new major supports all of these goals. It establishes a rigorous undergraduate curriculum that requires experiential learning and thesis writing as part of the degree. It will enhance graduate education through the larger influx of undergraduates into research laboratories, enhancing the mentoring opportunities of the graduate students. It will utilize a cohort of faculty already deemed worthy of PRSE designation, thus focusing on key areas of institutional strength.

### **• How does the program contribute to attaining long-term goals and directions of the institution and department/unit?**

The institution of an interdisciplinary neuroscience undergraduate major will further enhance the interactions and cooperation among faculty from multiple units, strengthening their ties and helping to develop and promote collaborative research projects. This is almost certainly to be the case since we will be finding research homes for 20-40 undergraduate students per year and expect many newly designed projects to be developed between labs to accommodate student interests. In particular, the DCN faculty will benefit from having a student cohort with much stronger cell and molecular training than is the

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current norm within the Department of Psychology and the CMN faculty will benefit from broader training of undergraduates in brain anatomy and function.

*• How does the proposed program meet the needs of Colorado and enhance the state's capacity to respond effectively to social, economic, and environmental challenges and opportunities?*

More than 600 disorders afflict the nervous system. Common conditions or diseases such as stroke, epilepsy, Alzheimer disease, Parkinson disease, and autism are well-known; many others are less well known, yet all compromise the lives of those afflicted. Similarly, mental disorders are true brain disorders with specific symptoms rooted in abnormal patterns of brain activity. Mental disorders such as schizophrenia, bipolar disorder, depression, anxiety disorder, dementia, and post-traumatic stress disorder (including traumatic brain injuries) should be considered serious, often life-threatening illnesses. Spinal cord injuries also have an enormous societal cost. **It is estimated that neurological disorders and injuries strike over 50 million (1 in 6) Americans each year,** and the World Health Organization reports that mental disorders comprise four of the top five sources of premature death and disability in 15-44 year olds in the Western world. Reliable diagnostic tests, new treatments, and effective strategies for prevention are still needed. Together, neurological diseases, mental disorders and spinal cord injuries exact an incalculable personal toll with an annual economic cost of many hundreds of billions of dollars in medical expenses and lost productivity.

Some important areas of basic neuroscience research at CSU include: normal and abnormal nervous system development, cellular and molecular underpinnings of cognition and behavior, neurodegeneration, mechanisms of brain plasticity and repair, neural signaling and synaptic biology, neuromuscular control, sensory function, and neural channels, synapses, and circuits. Studies on heavy metals and neurotoxins in the environment are particularly important to Coloradans, whose water supply is very limited. In addition, clinical research is being performed to translate the often remarkable findings of basic science into useful therapies for those who suffer the devastating effects of neurological and mental health disorders and stroke. Our goal is to provide a pool of well trained undergraduates to fill technical positions as well as to provide those who will seek higher degrees and who will become the leaders of research in neuroscience over the next several decades in our State and the Nation.

### **3. Evidence of Need for the Program**

*• Provide evidence of the need for the program. Please be explicit. (Needs assessment information may be presented in the form of survey data; summaries of focus groups or interviews; documented requests for the program from students, faculty, external constituents; etc.).*

As delineated below in section 4 (evidence of student demand), many students already in their junior or senior years have found their undergraduate major to be inadequate for preparing them for admission to competitive graduate neuroscience programs. For many of these students, lack of advising early in their careers have sent them down a path of course work that is totally inappropriate for their goals and often results in the need for additional course work, sometimes amounting to two additional full years, in order to meet entrance requirements for graduate neuroscience programs. This is more frequently true of psychology majors who realize too late the importance of appropriate chemistry, physics, mathematics, genetics and biology courses to prepare for a career in neuroscience research. Having a BS degree in the neuroscience area would provide a single source of information for these students and a common core curriculum that will provide all majors with an appropriate background for graduate or professional school.

Discussions among MCIN faculty for initiating an undergraduate program started many years ago. There has always been widespread support but with the initiation of the new Biomedical Sciences degree program, a delay was necessary to permit the large number of MCIN faculty involved in that program to assess its impact on their overall load. This degree program has now been in effect for several years and has reached its capacity. At the June 2008 MCIN faculty meeting the discussion of the undergraduate degree program surfaced again and was given strong encouragement (unanimous support from the 18

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attending faculty) to proceed to Phase 1. Colorado State University has a strong curriculum already in place and a broad faculty base to offer this undergraduate neuroscience major.

*• Identify statewide and nationwide employment needs the proposed program would assist in filling. Provide evidence of regional or national need for additional qualified individuals such as the proposed program would produce.*

During the past few years, the faculty members of the MCIN program have established working relationships with a number of private sector companies that includes Aurogen Inc. (Ft. Collins, CO), Cortex Pharmaceuticals (Irvine, CA), Cytoskeleton Inc. (Denver, CO), Elan Pharmaceuticals (South San Francisco, CA), Eli Lilly Inc. (Indianapolis IN), GlaxoWellcome Inc. (Research Triangle Park, NC), Ligand Pharmaceutical Inc. (San Diego, CA), Linguagen, Inc. (Cranbury, NJ), Pfizer Inc. (Groton, CT), Syngenta Crop Protection Inc. (Greensboro, NC), Tapestry Pharmaceuticals Inc. (Boulder, CO), Ventria Biosciences (Sacramento, CA), Capstone Therapeutics (Phoenix, AZ), Rapid Pharmaceutical (Rockville, MD) and Wyeth Pharmaceutical Inc. (Princeton, NJ). In addition to these companies, there are more than 25 Colorado companies with interests in neurological diseases, imaging or biosensors, all research strengths of the program and areas in which our students will be well trained. Many new bioscience spin-off companies have been developed as a result of the Supercluster initiative at CSU and through the biomedical research programs of the University of Colorado School of Medicine and CU Boulder. All of these companies will benefit from a local pool of qualified individuals with strong general bioscience training at the BS level and with a strong neuroscience background. Academic research programs at the major research universities in Colorado (UC School of Medicine, Aurora; CU Boulder; CSU Fort Collins) will also provide some job openings for BS level employees, as will government laboratories. The Center for Disease Control studies many viruses, such as herpes, which resides in nerves, or HIV, which causes a viral neuropathy. Prion diseases, such as mad cow and chronic wasting diseases, are being studied by 4 MCIN faculty members and local USDA research labs. Positions for well trained BS level students exist at many of these companies, universities and government labs.

#### **4. Evidence of Student Demand**

*• What are the projected numbers and characteristics (e.g., index scores, residency status, ethnic background) of the students to be served? What is the estimated number of graduates of the proposed program over the next five years? On what information are these projections based?*

The neuroscience major is likely to attract the same type of undergraduate as the biochemistry major, since the first two years are very similar and the upper division courses have the same rigor. Based upon this comparison, we anticipate the admitted students will have an average index score of about 118 with more than 20% qualifying for the honors program. This estimate was confirmed by results from a student survey in which students were asked several questions concerning a new neuroscience major. The survey was administered and results compiled by Student Voice, an independent organization. Responses were received from 307 CSU undergraduates majoring in Biochemistry (29), Biology (116), Biomedical Sciences (82), Psychology (72) and open option students (8) in CNS and CVMBS. Of these students, 22.4% are in the university honors program and of the 143 respondents (46.6%) who would have elected the neuroscience major if it had been available to them, 28.3% were honors students. Over 93% of the respondents who would have picked the neuroscience major plan to seek advanced degrees, another indication of the high quality of students this major would attract. Slightly over 20% of the survey respondents were out of state students and about an equal percentage of both in state and out of state residents would have selected the major if had been available to them. Thus, without advertising or promoting the major, it is as attractive as any current ones to out of state students. However, given the fact that no other nearby state offers a neuroscience major, we could capitalize on this fact to target out of state students and increase this percentage.

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*• Provide evidence from surveys, interviews, or other sources that indicates that students would actually enroll in this program if it were approved. Include as much detail as possible.*

Responses to the survey were received from 87 freshman, 51 sophomores, 76 juniors and 93 seniors. Of the 307 respondents, 143 (>46%) would have selected the neuroscience major if it had been available to them. Thus, we think it likely that the major will have at least 200 students at steady state. Over 110 of the 307 respondents wrote out specific comments on the survey form in space provided for feedback. Below are 10 quotes selected from among the first 20 survey responses:

"I am a psychology major and it was not until my junior year that I was able to take a neuropsychology class/lab. I found it fascinating and would have loved to have been able to receive an undergraduate degree in that area! Now, I am a senior and the prospect of going towards neuroscience as a masters seems hard since I did not have more science and math background for that specifically."

"This would interest many people. I was looking at one other school which had a neuroscience major, CSU and this other university were my only choices. A neuroscience major would definitely bring many people in who are interested in neuroscience."

"A neuroscience major might relieve congestion/overcrowding in other majors since it provides a place for students that already know where they want to go with their degree."

"As a BMS student, I have found that I love the neuroscience classes that I have taken and would be extremely interested in perhaps double majoring in BMS and the new Neuroscience major. I love my physiology classes as well, and would very much like to still take them along with other neuro classes. You should also consider making a minor option for students like me. This is a great idea! I would have a hard time choosing which concentration!"

"As a psychology major my favorite course was physiological psychology. With that course I was introduced briefly to cognitive and behavioral neuroscience and would have loved having more courses related to this field. Neuroscience is a growing field, with the large number of neurological disorders still being researched for origins and effective treatment, giving undergraduates an option to major in the area will create a strong, competitive environment for research. More students may have stronger graduate resumes with a more focused major, giving rise to more undergraduates matriculating into graduate and doctoral programs in medicine and neuroscience."

"CSU would have been my top choice of school had it had a neuroscience degree. As is, I am trying to double in biology and psychology so I can still go in to neuroscience. Sign me up!"

"Establish it quick, before I graduate, so that I can add it."

"Even though I said I would follow the CMN track, I would also be really interested in BCN. It sounds like a really promising major, going right along with one of my potential career paths after I earn my undergrad degree at CSU."

"Great idea! It can build upon the already successful graduate program in neuroscience and continue to prove CSU's dedication to biomedical sciences."

"Great idea. I wish it had been available when I had enrolled."

## **5. Duplication/ Similar Programs in the State**

*• Identify other closely related Colorado programs. List these by title of program and name/campus of institution that might be perceived as having programs in the same academic domain. For each, provide the following:*

*• Title of Program:* Undergraduate Certificate in Neuroscience

*• Name of Institution (particular campus if relevant):* University of Colorado, Boulder

*• Focus of other program's curriculum:* An individualized certificate program in which students must select from lists of courses in various areas.

*• Compare/contrast CSU's proposed program to other program:* The Neuroscience Certificate encourages undergraduate students at the University of Colorado (Boulder) to take courses in basic

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science while providing a means to specialize in neurosciences

(<http://www.colorado.edu/neuroscienceprogram/ugcert.html>). Since this area of the biological sciences is cross-disciplinary, interdepartmental course selection is possible and encouraged. Applicants must satisfy the requirements of: 1) the parent department of their major, 2) their college's core curriculum, and 3) the Neuroscience Certificate. They then receive an undergraduate degree in their parent department with certification in neuroscience.

The CU Boulder certificate program has about 52 participating faculty that cover a broad range of neuroscience research areas, much like the CSU program. However, it differs considerably from our proposed program in that:

1. No neuroscience undergraduate major is offered; 2. Students remain within their home department for advising and thus do not build the camaraderie that students develop with others within their major; 3. There is no requirement for an undergraduate thesis; 4. There is not a specific set of core neuroscience undergraduate courses that are required; 5. The certificate requires only two upper division neuroscience/behavior courses only one of which is outside the students major. Our program requires a specific set of upper division courses totaling between 4 and 7 within the area.

Regis University, a private school in Denver, offers a neuroscience program through their psychology department but it has only three faculty members and offers a limited curriculum with very few research opportunities. Colorado College in Colorado Springs also offers a neuroscience major with 7 faculty members across three departments. As with Regis University, the on campus research opportunities are quite limited. A strong feature of the CSU program is its experiential learning aspect, culminating in the preparation of a senior thesis.

• *If program is similar to the one being proposed by CSU, is there documented state or national demand legitimizing the need for an additional program in the state? N/A*

• *In what ways, if any, will resources of other Colorado State University programs or other state institutions be shared in the proposed program? How will the proposed program be complementary to, or cooperate with existing program(s)?*

The University of Colorado at Boulder has recently changed the name of their psychology department to the Department of Psychology and Neuroscience but does not offer an undergraduate degree in neuroscience. Their Center for Neuroscience offers the Certificate in Neuroscience discussed above. CU has about 52 faculty members within their Center for Neuroscience, a program similar to the MCIN program at CSU. Both the CU and CSU programs have strong faculty research in a number of areas that overlap but also in areas that complement each other. We already cooperate effectively at the graduate program level by sharing seminar speakers from out of state. Many members of the CU faculty and CSU faculty are members of the Fort Collins based Front Range Neuroscience Group, a chapter of the Society for Neuroscience (SfN), as well as the Rocky Mountain Regional Neuroscience Group, also an SfN chapter, based at the University of Colorado School of Medicine. We coordinate our annual meetings so that one is in May and one is in Nov./Dec.

## PHASE 2

**Proposal for New Undergraduate Degree Program in Neurosciences**

Submitted by James R. Bamburg on behalf of the Neuroscience Faculty

Phase 1 approved by Council of Deans, March 10, 2010

**Students****6. Student Body**

- *What is the ideal total student enrollment and what is the ideal "entering class?"*

The ideal size of the major is about 200 students with an entering class each year of about 50 students starting in the fall semester of 2014. We will admit only incoming freshman for the first two years. This policy is necessary because new resources for establishing the program are being provided based upon new incoming students with penalties instituted if there are drops in enrollment in programs with similar core requirements. In addition, the lag between funding and hiring of additional faculty makes it difficult to fully staff the upper levels courses immediately. After the end of the second year we will open the program to internal and external transfer students. We anticipate a demand that will allow us to graduate between 45-50 students per year at steady state. The rigor of the required curriculum will be the major factor in limiting large enrollments. ~~Because the degree program will be phased in, there may be a cohort of existing students who want to complete the degree requirements while within an existing major. This would be allowed for the first three years of the degree program and students who complete all of the available required courses for either the Behavioral and Cognitive Neuroscience (BCN) Concentration or the Cellular and Molecular Neuroscience (CMN) Concentration, with the exceptions of NB 192, 399, 493 and 499, will qualify for a transcript endorsement stating "This student has completed the core curriculum requirements for the B.S. degree in Neurosciences."~~

- *Is the proposed program intended to provide another program option to a significant number of students who are already being attracted to or attending CSU?* No. The program is intended to attract top notch students from high schools in Colorado and surrounding states who would not come here because we do not have an undergraduate neuroscience major. However, because CSU has a strong research base and national reputation in neuroscience through our graduate Neuroscience Program, we already attract the attention of a number of students who might desire this major. The courses required in the CMN concentration are more rigorous and extensive in physical sciences and mathematics than are currently required for any CSU bioscience degree except for biochemistry, and this alone will limit the numbers of students who will be transferring between majors. The courses required in the BCN concentration are also much more rigorous and extensive in physical sciences and mathematics than what is required for a degree in psychology, even for those students within the Mind, Brain and Behavior Concentration who are not required to take calculus, physics, genetics, cell biology, organic chemistry, or biochemistry, all of which are required in the BCN concentration.

- *If the program is expected to attract students from other campus departments, attach a letter from the relevant department head and dean indicating their support (or lack thereof) for the new proposal in terms of shift of student enrollment from that particular department.* The BCN concentration might draw some students away from a major in psychology, although as already stated the curricula are very different. The CMN concentration might draw a few students away from the Biomedical Sciences major (but it is already a capped program operating at capacity so this would provide an alternative for some students who can't get into that program) and from Biochemistry, but the numbers are likely to be very small.

- *Is it anticipated that the proposed program will draw students who would not otherwise come to the institution?* This is definitely our intention. When this proposal was first put forward in 2010, there were only two public comprehensive research universities nationwide that offered undergraduate neuroscience majors (University of Minnesota and Washington State University). Now more than 10 public research universities offer such a degree suggesting the increased interest in this major. However, almost all of these competing programs are concentrated east of the Mississippi River (see map, Appendix 1) with a few new ones in California (Irvine, Los Angeles and Riverside campuses of UC

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system). We plan to advertise our program to the high schools in states surrounding Colorado, none of which offer a neuroscience B.S. degree.

• *What is the student profile in other programs that the department currently offers (e.g, mean index score; residency compared to nonresidence numbers; ethnicity of student body). Is there any reason to believe that the profile of the student body in the new program area would be any different than the existing profile? Please explain.* This new program is not within an existing department. However, we anticipate it will attract students with similar index scores to those entering the Biochemistry major because the level of rigor between the two curricula is similar. Thus we are providing the requested information for students registered in the Biochemistry BS degree program in Fall 2012. However, it should be noted that unlike neuroscience, all surrounding states have biochemistry majors at their state universities.

	Number	Percent
Total of students in major in Fall 2012:	192	100%
Mean Index Admission Score	120	
Honors Program Participants	31	16%
Resident Status		
Colorado Residents	169	87.5%
Non-resident	24	12.5%
Gender		
Male	92	47.9%
Female	100	52.1%
Ethnicity		
White	142	73.9%
Asian	14	7.3%
Black	8	4.2%
Hispanic	12	6.3%
Native American	3	1.6%
Multiple Identity	8	4.1%
Not reported	5	2.6%

## 7. Admission Requirements

• *Are any requirements for admission to the proposed program being recommended that are higher than CSU's minimum requirements?* No.

## Program and Assessment

### 8. Course of Study

• *List all courses comprising the program's overall curriculum. Please provide the following information for each course: course number, title, credits, prerequisite, catalog description (NOTE: approval of four new NB courses is accompanying this curricular approval application). Electives and AUCC courses are not shown. Courses with bold green font are required only for BCN concentration and those in red italics are required only for CMN concentration.*

Course #	Title	Credits	Conc.	Prereqs
BC 351	Princip. of Biochem.	4	BCN	BZ 110 or BZ 120 or LIFE 102; CHEM 245 or CHEM 341 or CHEM 345
BC 401 <sup>1A</sup>	Gen. Biochem.	3	CMN	CHEM 245 or CHEM 343 or concurrent reg. or CHEM 346 or concurrent reg.; MATH 155 or MATH 160
BC 403 <sup>1B</sup>	Gen. Biochem. II	3	CMN	CHEM 245 or CHEM 341 or CHEM 345.
BC 404	Gen Biochem Lab	2	CMN	BC 401 or concurrent reg.; CHEM 246 or CHEM 344 or CHEM 346; LIFE 203; LIFE 212
BC 465	Mol Reg Cell Fn	3	CMN	LIFE 210; BC 403 or concurrent reg. or BC 351.
BMS 300	Princ.Hum. Physiol	4	Both	BZ 101 or BZ 110 or LIFE 102; CHEM 103 or CHEM 107 or CHEM 111
BMS 325	Cellular Neurobiol.	3	Both	BMS 300 or BMS 360.

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BMS 345	Funct. Neuroanat.	4	Both	BMS 300 or BMS 360
CHEM 111	Gen Chem I	4	Both	MATH 118 or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261 or concurrent reg. in MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261.

<u>Course #</u>	<u>Title</u>	<u>Credits</u>	<u>Conc.</u>	<u>Prereqs</u>
CHEM 112	Gen Chem Lab I	1	Both	CHEM 111 or concurrent reg. or CHEM 117 or concurrent reg.
CHEM 113	Gen Chem II	3	Both	CHEM 107 or CHEM 111 or CHEM 117; MATH 124 or MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261 or concurrent reg. in MATH 141 or MATH 155 or MATH 160 or MATH 161 or MATH 229 or MATH 261.
CHEM 114	Gen Chem Lab II	1	Both	CHEM 112; CHEM 113 or concurrent registration
CHEM 341	Mod.Org Chem I	3	Both	CHEM 113
CHEM 343	Mod. Org Chem II	3	Both	CHEM 245 or CHEM 341 or CHEM 345
CHEM 344	Mod. Org Chem Lab	2	Both	CHEM 343 or concurrent reg. or CHEM 346 or concur.reg.
LIFE 102	Attrib. of Living Sys.	4	Both	High school chemistry.
LIFE 201B	Intro Genetics	3	Both	LIFE 102
LIFE 203	Genetics Lab	2	Both	LIFE 201A or concurrent reg. or LIFE 201B or concur. reg.
LIFE 210	Cell Biol	3	Both	LIFE 102; CHEM 111 or concur. reg.; CHEM 112 or concurrent reg.
LIFE 212	Cell Biol Lab	2	Both	CHEM 112 or concurrent reg.; LIFE 210 or concurrent reg.
MATH 155	Calculus I	4	Both	MATH 124; MATH 125
MATH 255	Calculus II	4	CMN	MATH 126 or concurrent reg.; MATH 155
MIP 300	Intro. Microbiol.	3	CMN	BZ 110 or BZ 120 or LIFE 102; CHEM 245 or concurrent reg. or CHEM 341 or concurrent reg. or CHEM 345 or concur.reg.
MIP 342	Immunology	4	CMN	CHEM 245 or concur.reg. or CHEM 341 or concur. reg. or CHEM 345 or concur.reg.; LIFE 201B or LIFE 210 or MIP300.
*NB 192	Freshman Seminar	1	Both	None
*NB 399	Pre-Thesis	1	Both	None; will require junior standing in major when instituted
*NB 493 <sup>4C</sup>	Senior Sem.	1	Both	None; will require senior standing in major when instituted
*NB 499 <sup>4A,4C</sup>	Thesis	3	Both	None; will require NB 399 when instituted
PH 121	Gen Physics I	5	Both	MATH 125 or concurrent registration.
	or			
PH 141	Physics for Sci Eng I	5	Both	MATH 126; MATH 155 or concurrent reg. or MATH 160 or conc. reg.
PH 122	Gen Physics II	5	CMN	PH 121
	or			
PH142	Physics for Sci Eng II	5	CMN	PH 141; MATH 161 or concurrent reg. or MATH 255 or concurrent reg.
PSY 100	Gen. Psychology	3	Both	None
PSY 250	Res. Meth. Psych.	4	BCN	PSY 100
PSY 252	Mind, Brain, Behavior	3	Both	PSY 100
PSY 352	Learning & Memory	3	BCN	PSY 252
	or			
PSY 452	Cognitive Psych.	3	BCN	PSY 252
PSY 454	Biological Psych.	3	BCN	PSY 252
PSY 455	Biolog. Psych. Lab.	2	BCN	PSY 454 or concurrent reg.
PSY 456 <sup>4B</sup>	Sens. Percep.	3	BCN	PSY 252
PSY 457	Sens. Percep. Lab	2	BCN	PSY 456 or concurrent reg.
PSY 458 <sup>4B</sup>	Cog. Neuroscience	3	BCN	PSY 252
PSY 459 <sup>4A</sup>	Cog. Psych. Lab	2	BCN	PSY 458 or concurrent reg.
STAT 301	Intro to Stat. Methods	3	Both	MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160
	or			
STAT 307	Intro to Biostatistics	3	Both	MATH 117 or MATH 118 or MATH 124 or MATH 125 or



\*All NB courses have been submitted for approval with the Phase II document.

Category 4 courses are shown with blue footnotes.

- Provide a discussion of any nontraditional learning modes to be utilized in the new courses, including, but not limited to: (1) the role of technology, and (2) the use of career development activities such as practica or internships.

Graduation from the major requires submission and defense of a written undergraduate thesis (completion of NB 499). We envision about half of the theses will be based upon original research work performed by the undergraduates in the laboratories of neuroscience faculty. The remainder of the theses will be literature-based on a topic of the students' choosing but which requires faculty approval and assignment of a thesis mentor. Topic approval and mentor assignment will take place at least one semester in advance of submission during the required NB 399 thesis preparation course. Students wishing to do a semester abroad may obtain approval for an international internship and may submit a thesis on a topic to be preapproved with an assigned CSU mentor/sponsor. CSU credit for internship may be earned through the independent study course NSCI 495 or the internship course NSCI 487, and grades are assigned by the CSU mentor/sponsor with input from the host institution. Establishment of these course numbers under the NB subject code will be undertaken in the future since we do not anticipate any enrollment in courses at this level before Fall 2016.

### 9. Curriculum – courses and total structure

Include total curriculum design as discussed at University Curriculum Committee. Use the appropriate UCC forms, found on the web. Once the Phase I report has been approved, you may choose to submit this packet to University Curriculum Committee to get preliminary feedback as to whether they have any questions or concerns about the proposed curriculum. The total curriculum design will be submitted to the UCC in August of 2013 after review by the CNS and CVMBS curriculum committees. Forms for each of the concentrations are included in Appendix 2.

We anticipate a significant number of students attracted to this major will be interested in the University Honors Program, and thus will offer both Track I (University Honors Scholar) and Track II (Discipline Honors Scholar) curricula to students in both the CMN and BCN concentrations. The following Honors Tracks have been examined by Donald Mykles, Director of the University Honors Program and are ready for submission to Faculty Honors Council for approval.

#### Track I Honors Curriculum (CMN and BCN)

Students from both concentrations would substitute the following courses:

<u>Current Curriculum</u>		<u>Honors Replacement</u>	
AUCC core	15 credits	HONR: 192	4 credits
		193	3 credits
		392	3 credits
		492	3 credits
LIFE 201	3 credits	LIFE 201H	3 credits and LIFE 202 1 credit
or		or	
LIFE 210	3 credits	LIFE 210H	3 credits and LIFE 211 1 credit
BMS 325	3 credits	BMS 325H	3 credits
NB 399	1 credit	HONR 399	1 credit
<u>NB 499</u>	<u>3 credits</u>	<u>HONR 499</u>	<u>3 credits</u>
Total	25 credits	Total	24 credits

#### Track II Honors Curriculum (CMN concentration)

IU 193H	1 credit
BC 401	3 credits
MIP 300H	3 credits
BMS 325H	3 credits
BC 465	3 credits
BC 466H	1 credits (newly approved 1 credit honors recitation for BC 465)
NB 399	1 credit (in place of HONR 399)
<u>NB 499</u>	<u>3 credits (in place of HONR 499)</u>
Total	18 credits

Version ~~9-47-11-2013~~rev2**Track II Honors Curriculum (BCN concentration)**

IU 193H	1 credit
BMS 300H	4 credits
BMS 325H	3 credits
*PSY 352	3 credits
*PSY 452	3 credits
NB 399	1 credit (in place of HONR 399)
NB 499	3 credits (in place of HONR 499)
Total	18 credits

\*Honors options for these courses are done by individual student requests.

**10. Assessment of Student Learning/Outcomes Evaluation**• *What specific learning outcomes will be achieved by students who complete this proposed program of study?*

1. Students will demonstrate proficiency in the major and obtain appropriate academic and career advising, with an emphasis on retention.
2. Graduates will find professional employment related to their major and/or have opportunities for further training in graduate or professional schools.
3. Students will have opportunities for individualized educational experiences and/or for conducting research.
4. Students will have opportunities to participate in diverse cultural experiences and to integrate academic and co-curricular experiences.
5. Students are expected to gain a core knowledge of neuroscience. Key elements for the major and those pertinent to each concentration are listed below:

## a. For All Students:

- 1) Organization of the nervous system
- 2) Cellular components of the nervous system
- 3) Electronic properties of axons and dendrites
- 4) Neurotransmitters, synaptic function and cell-cell communication
- 5) Neuronal differentiation and nervous system development
- 6) Function of sensory systems
- 7) Function of motor systems
- 8) Central control of autonomic functions
- 9) Brain and spinal cord neuroanatomy
- 10) Basic mechanisms of learning and memory

## b. For BCN Concentration Students:

- 1) Human brain evolution
- 2) Cognitive development
- 3) Spatial cognition
- 4) Sensory perception
- 5) Learning and memory: systems analysis
- 6) Language and communication
- 7) Thinking and problem solving
- 8) Behavioral regulation and abnormalities

## c. For CMN Concentration Students:

- 1) Mechanisms of neuronal differentiation and polarity establishment
- 2) Molecular mechanisms establishing neuronal circuitry
- 3) Energy metabolism of the brain: normal, during exercise, in disease, and during starvation.
- 4) Specific mechanisms of some excitatory and inhibitory neurotransmitter signaling pathways
- 5) Molecular basis of taste and olfaction
- 6) Molecular mechanisms of visual transduction
- 7) Molecular basis of hearing and balance
- 8) Molecular basis of neurodegenerative diseases

• *What methods will be used to assess student learning? How will student learning assessment be embedded in the curriculum?*

~~• Students must maintain 2.00 average for all required LIFE, CHEM, PSY, BMS, BC and NB prefix lecture and laboratory courses.~~

- Probationary students are contacted and informed of options for improving academic performance. The number of students who move off probation and are retained will be tracked and counted.
- Quantifying the number of national, state, university, and departmental scholarships awarded.
- Career advising; Quantifying the number of visits or contacts to the Career Center.
- Query graduating seniors about the nature and quality of career advising by an online survey.
- Academic advising; Quantify the number of students contacting the Director/key advisor(s).
- Query graduating seniors about the quality of academic advising by online survey.
- Survey alumni five and ten years after graduation about current employment and preparation they received.
- Query graduating seniors about post-graduation plans via online survey, reporting the number of students who: (a) enter M.S. degree programs; (b) enter Ph.D. degree programs; (c) enter professional schools; (d) are employed in related field, including industry, government agencies, or education.
- Collect data on students participating in research reported by faculty through FAS. Quantify numbers who participate in peer-reviewed published papers based on their undergraduate research.
- Query graduating seniors by online survey, counting the number of students: (a) in the Honors program; (b) who complete Honors theses; (c) engaged in undergraduate research; (d) enrolled in seminars; (e) enrolled in independent study or internship; (f) who presented at the annual Celebrating Undergraduate Research and Creativity symposium on campus; (g) who are participating in the combined B.S./M.S. program.
- Query graduating seniors by online survey, counting the number of students who: (a) are underrepresented ethnic minorities; (b) participated in study-abroad or international internship programs; (c) participated in service-learning activities in the community; (d) participated in campus organizations.
- Track the percentage of underrepresented ethnic minorities in major by class year.

• *What specific methods or approaches will be used to assess graduate (completer) outcomes?*

An on-line test with questions drawn from core LIFE, CHEM, BMS, BC and PSY courses will be administered to freshmen in NB 192, Introductory Seminar, and to graduating seniors toward the end of their final semester. ~~Completion of the exam will be a requirement of obtaining a grade in NB-499.~~

• *Is a licensure examination associated with this field of study?* No.

• *How will the institution determine the extent to which the academic program meets the objectives (section 2) previously outlined? (Identify specific post-approval monitoring procedures and outcome indicators to be used.)*

- Retention will show steady improvement. Numbers of majors and scholarships received will increase with time. Utilization of academic and career advising will increase and the level of satisfaction will improve.
- Graduates are expected to find employment in a field that utilizes their education in neuroscience, such as research in the biosciences, as a health professional, in biotechnology, etc. We will look for increases from baseline levels established during the first years of the surveys.
- A steady increase in the extent to which undergraduate students participate in research is anticipated.
- It is anticipated that the freshmen will be able to answer few, if any, of the questions on the student outcome assessment exam whereas graduating seniors should score highly on the exam.

• *How will the collected information be used to improve teaching, advising, and co-curriculum activities to enhance student learning?* Each year after the second year the program is in place, the Associate Director of Undergraduate

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Affairs (ADUA) (who will serve as Program Assessment Coordinator) will compile, organize, and summarize findings. These will then be shared with the Administrative Oversight Committee and the Neuroscience Program Executive Committee. An undergraduate affairs committee has been codified through the Neuroscience Program to include representatives from both the College of Natural Sciences and the College of Veterinary Medicine and Biomedical Sciences who are actively involved in undergraduate programs. In September of each year, a recommendation report from the executive committee will be submitted to the undergraduate affairs committee who will consider how to implement the recommendations and present their recommendations to the neuroscience faculty who will vote on their implementation.

**Faculty****11. "Snapshot" of Faculty Resources**

- Identify current program faculty, briefly describing each faculty member's expertise/specialization. Summarize faculty resources using the following table. Specialization is defined by concentration names.

Last Name, First Name	Tenure-track/Tenured	Highest Degree	Area of Specialization	Program Role	
				Research	Teaching
Amberg, Gregory	Tenured-track	Ph.D.	CMN	X	X
Anderson, Charles	Tenured	Ph.D.	Computer modeling	X	X
Bamburg, James	Tenured	Ph.D.	CMN	X	X
Bessen, Richard	Tenured	Ph.D.	CMN	X	X
Cleary, Anne	Tenured-track	Ph.D.	BCN	X	X
Davies, Patricia	Tenured	Ph.D.	BCN	X	X
Draper, Bruce	Tenured	Ph.D.	Computer modeling	X	X
Earley, Scott	Tenured-track	Ph.D.	CMN	X	X
Florant, Gregory	Tenured	Ph.D.	CMN	X	X
Garrity, Deborah	Tenured	Ph.D.	CMN	X	X
Hentges, Shane	Tenured-track	Ph.D.	CMN	X	X
Hoke, Kim	Tenure-track	Ph.D.	BCN	X	X
Ishii, Doug	Tenured	Ph.D.	CMN	X	X
Mykles, Donald	Tenured	Ph.D.	CMN	X	X
Partin, Kathryn	Tenured	Ph.D.	CMN	X	X
Prasad, Ashok	Tenured-track	Ph.D.	CMN	X	X
Rash, John	Tenured	Ph.D.	CMN	X	X
Reist, Noreen	Tenured	Ph.D.	CMN	X	X
Seeger, Carol	Tenured	Ph.D.	BCN	X	X
Tamkun, Michael	Tenured	Ph.D.	CMN	X	X
Telling, Glenn	Tenured	Ph.D.	CMN	X	X
Thaut, Michael	Tenured	Ph.D.	BCN	X	X
Tjalkens, Ronald	Tenured	Ph.D.	CMN	X	X
Tsunoda, Susan	Tenured-track	Ph.D.	CMN	X	X
Vigh, Jozsef	Tenured-track	Ph.D.	CMN	X	X
Volbrecht, Vicki	Tenured	Ph.D.	BCN	X	X
Walrond, John	Tenured	Ph.D.	CMN		X
Whalen, R. Ray	Tenured	DVM, Ph.D.	CMN		X
Zabel, Mark	Tenure-track	Ph.D.	CMN	X	X

- Estimate the number, rank, and background of new faculty members who would need to be added to initiate the proposed program in each of the first four years of the proposed program's operation (assuming the program develops as anticipated). Two new faculty members, one in CNS and one in CVMBS, will be hired or recruited during FY2014. The search for a third faculty position will be initiated during FY2016 for hire in FY2017. The area of expertise for this position will be determined from enrollment patterns for the two concentrations and will be in the area of greatest student

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demand. A half-time instructor will be hired in Biomedical Sciences in FY2014 to help meet institutional capacity issues and will be converted to a full time position in FY2015. An instructor/key advisor will be hired in FY2014 and a half time instructor for the LIFE core will be hired in FY2016.

Number	Rank	Background	Year Added
1	Assist./Assoc Prof.	Ph.D. (BCN)	FY2014
1	Instructor	Ph.D. (CMN- neuroanatomy/neurophysiol)	FY2014 (50%) and full time in FY2015
1	Instructor	MS/Ph.D. with some neuroscience courses	FY2015 (50%) and full time in FY2016
1	Assist. Prof.	Ph.D. (CMN)	FY2015
1	Instructor (half-time)	Ph.D. (CMN-Biochem/cell biol)	FY2016
1	Assist. Prof.	Ph.D. (area of greatest need)	FY2017

*What resource commitment is required and how will it be provided?*

Provost and Administrative Oversight Committee have agreed on the faculty and instructor hiring in FY2014 prior to program initiation. Funding will be through a tuition revenue sharing agreement with a 50/50 split of revenue return between the central administration and the two colleges. Office space for the undergraduate program director (ADUA) and instructor will be provided by one of the participating departments (Biochemistry and Molecular Biology, Biology, Biomedical Sciences or Psychology) for the first year through discussion with the Administrative Oversight Committee and their input from departmental chairs. One time funds for renovating space is requested in year one funding to establish a permanent home by year 2. We are requesting 1.5 month salary support for the ADUA in FY2014 for recruitment activities and three months of support after the program starts admitting students (the ADUA will be the advisor, administrator, recruiter and instructor for Introductory Seminar during the initial year of operation). New faculty recruited in FY2014, FY2015, and in FY2017 will be added to participating departments through standard means. The department wishing to add the new faculty member will put forward appropriate research laboratory space to house the new faculty member and will negotiate with the Neuroscience Program Director, Academic Oversight Committee, and the Vice President for Research for start-up costs. About 25% of the anticipated start-up costs are being requested as one time funding in our budget with the other 75% coming from the hiring department, college and VPR. The 9 month RI salary package for the new faculty member will be provided through the Neuroscience BS degree program budget to departments with an MOU from the Academic Oversight Committee to ensure that the position will be maintained in future years as one supporting the neuroscience degree program.

Because the program is the first to be housed under an SAU, the Provost and the AOC will have to agree to a mechanism by which unspent program funds do not penalize any college or department which is given responsibility for the budget and likewise will not unfairly penalize the college or department for any program deficit that arises due to unmet enrollment projections.

• *Estimate the number and type of support staff needed in each of the first four years of the program.* During the first year of enrollment, the ADUA will handle administrative and advising matters, hiring and training a key advisor during the spring semester of the first year. Before the start of the second year, a full time administrative assistant will be hired to handle office issues as enrollment grows to about 100 student majors. The key advisor/instructor will co-teach the Introductory Seminar, advise students, and help coordinate research lab assignments and the preparation and defense for non-research theses. A major role of the ADUA will be to recruit top notch students from both out-of-state and in-state high schools, to administer the program, and coordinate instruction, outcomes assessment, and to help place students in research labs.

**12. Faculty Vitae**

• *For a new undergraduate program, include abbreviated vitae (1-3 pages) for all tenured/tenure track faculty members as appendices. A three page vitae for each faculty member with a description of their participation in undergraduate and graduate education is included in Appendix 3.*

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**13. Impact of Program Request on Curriculum and Students**

- *What is the current department enrollment by degree level?*

The program is not within a single department but is a Special Academic Unit that currently offers no degrees.

- *Are any of the department's current program areas "controlled" or "capped"? Is the Center for Advising and Student Achievement (CASA) currently involved in advising any majors for a "seeking" category that involves any of the department's degree areas? No.*

- *If approved, how will launching a new degree impact the commitment already made to students in other program areas?*

The most likely area of impact would be in Biomedical Sciences, where undergraduates in the BMS major seeking research opportunities will face competition from the neuroscience majors since about half of that department's research faculty members perform neuroscience research. However, the BMS program does not have a required undergraduate thesis. BMS faculty members are aware of this potential competition for lab positions and have stated that they will take on undergraduate research students who demonstrate a strong commitment to research regardless of their degree program.

- *Provide a detailed plan as to how resources within the department would be re-allocated to contribute to the resource base needed for this proposed program. There is no department, but the Provost has set aside about \$188,000 to fund the initial year of the program (FY2014), based upon a tuition revenue sharing plan as outlined under item 16 (and Appendix 4). After 5 years, all faculty and 6 of the 9 GTA positions will be placed within departments with funding for those slots directed to departmental budgets. The tuition revenue sharing plan will continue indefinitely for the program's operational and staff budget (14% of revenue), allowing room for growth if the program successfully meets its goals.*

- *What are "collateral expenses" that must be taken into account in order to offer this academic program?*

The chairs of Biochemistry and Molecular Biology, Biomedical Sciences, Chemistry, Mathematics, Microbiology, Immunology and Pathology, Physics, Psychology and Statistics as well as the director of the LIFE core have been contacted to discuss how the addition of this major would impact the teaching loads and sections of the courses required. Memos received from each of these departments are included as Appendix 5 and are summarized below. These memos assume an immediate enrollment of 50 students per class. At least five new GTA positions (10 semesters of support) will be required to meet the additional needs of the lab/recitation sections required for Chemistry, Physics, Mathematics and LIFE courses during the first two years, and four additional GTA positions (8 semesters of support) will be required to meet the needs of the upper division courses in years three and beyond (9 total GTA slots). One half-time instructor is also required for covering the additional section of BC404 and LIFE 212 (biochemistry and cell biology). The neuroanatomy course (BMS345) is very labor intensive and is best taught with 2 GTAs per section. Courses that require some additional instructors/GTAs are shown in the following table. Lecture courses can absorb the additional students because most have an on-line version that has reduced pressure for larger class rooms. Our current request for 9 GTA slots (18 semesters of support) are to be phased in as follows: three in year 1; three in year 2; two in year 3, one in year 4. The new half time instructor will be needed in year 2. Six of the GTA positions will be assigned to departments on the basis of need for providing the sections required for our students. Three GTA positions will be maintained by the program to support neuroscience graduate students who will teach in appropriate courses in biomedical sciences or psychology.

Course	New sections required	GTA semesters support	New Instructors
LIFE 102	2	1	
LIFE 203	2	1	
LIFE 212	2	1	One semester, half time
CHEM 344	2	2	
MATH 155	1	1	
MATH 255	1	1	
STAT 307	2	1	
BMS 300	2 (recitation)	1	
BMS 325	none	1 (to help deal with large class size and exams)	
BMS 345	1	2	
BC 404	1	0.5	One semester, half time

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PH 121	2	1	
PH 122	1	0.5	
PSY 452 <del>3</del>	2	1	
PSY 455	2	1	
PSY 457	2	1	
MIP 300	1	0.5	
MIP 342	1	0.5	

**14. Library Reference Sources:** (Note: this section must be reviewed by the Library Staff and certified by the Dean of the Libraries. Seek feedback from the Dean of the Library during Phase 1 so that work might begin on adequacy of the collection).

• Describe the adequacy of student and faculty access to library and department resources (including, but not limited to, printed media, electronically published materials, videotapes, motion pictures, CDROM and online databases, and sound files) that are relevant to the proposed program (e.g., is there a recommended list of materials?).

There is no recommended list of which we are aware. Because books in neuroscience become out of date relatively quickly, only some of the classics in the field are probably worthwhile having and many of these are available in the CSU library. CSU already has a strong graduate program encompassing neuroscience research and thus the library holdings and accessibility to electronic journals is already quite strong. Nevertheless, there are a few new journals, which because of their high impact factor, should be added to the collection. These are listed in the memo from the Dean of Libraries which is included as Appendix 6.

• How much, if any, additional financial support will be required to bring access to such reference materials to an appropriate level? How is it proposed that these additional resources will be provided? Maintaining the current access to electronic journals is important but for this undergraduate program, resources beyond what is listed above are not required.

#### **15. Facilities, Equipment, and Technology**

• What unique resources (in terms of buildings, laboratories, computer hardware/software, Internet or other online access, distributed-education capability, special equipment, and/or other materials) are necessary to offer a quality program in the field?

One of the reasons that offering this degree program at Colorado State University is so attractive is that we already have exceptional research facilities for neuroscience. With almost 30 faculty spread between 5 colleges and 11 departments, students can gain access to the best specialized equipment in a number of areas. Some of these facilities are maintained through core infrastructure grants from the VPR and include the Microscope Imaging Network and the Proteomics and Metabolomics Laboratory. Some additional equipment in the teaching laboratories might help improve instruction of basic methodology, but these can be obtained through cooperation between the new Neuroscience degree program (and the tech fee funds generated) and departments delivering the essential laboratories. Some equipment upgrades for teaching labs have been requested as one time funds for FY2016.

• What resources for facilities, beyond those now on hand, are necessary to offer this program? Beyond the first year of the program it will be necessary to establish a program office with space for the ADUA, the key advisor/instructor and the administrative assistant. Access to a conference room will also been needed for both group advising and for freshman seminar courses.

*What facilities would enhance the program? Be specific (e.g., include need for new space, renovated space). Be sure to address classrooms, instructional labs, office space, etc.*

As stated above some office space out of which to run the program will be needed. In addition the program needs to have access to conference room space for its undergraduate seminar courses. Colorado State University has a need for additional quality lecture rooms for sections of more than 90-100 students. Lack of access to these classes in a timely fashion often delays student progress in their degree program but adding additional sections often requires another full FTE faculty, often unavailable and expensive to add if available. Many of the teaching labs in the Yates Building are running at or near full capacity for normal class hours and we may need to have additional evening sections to

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accommodate the loads. The new classrooms in the Behavioral Sciences Building will help alleviate some of the space problems for medium sized lecture courses, but we should continually plan to add larger rooms to new facilities early in the planning stage. However, the conversion of some of the larger classes (e.g. BC351 and BMS325) to on-line accessibility has lessened the classroom pressure on some of the largest courses.

• *What resources for equipment, and technology, beyond those now on hand, are necessary to offer this program? How is it proposed these additional resources will be provided?*

We need to add some basic equipment for a LIFE 212 labs and a new section of BC404 lab (FY2016), requiring about \$40,000 in upfront investment. The equipment will then be maintained and replaced using technology fee funds, part of which will come from new students in the neuroscience major. Some of the requested program support funds will be used to enhance the undergraduate thesis research experience by providing small amounts of funding (\$500 max per student) for items needed in the training of the undergraduates in their first semester doing independent study. An expansion of space in Biomedical Sciences to house the laboratory for neuroanatomy is an important goal for the next two-three years.

### **16. Summary of Budget Needs**

*Summarize all new budget resources you are requesting from CSU Central Administration. As part of this section, complete the attached financial planning form.* We propose this new program be funded by a tuition revenue sharing plan with funds coming from recruitment of NEW undergraduate students. The attached financial planning form (**Appendix 4**) shows that the program will require a return of 64% of tuition revenue for year 1, but decreasing to about 30% when steady state is reached in year 5. As an SAU, the program has no financial support mechanism other than its tuition sharing; thus its only means of covering deficits brought about by failing to meet its recruitment goals is to decrease its rate of expansion and hiring in subsequent years. It cannot be expected to cover deficits within the year that they occur.

### **Attached Appendices**

1. Map of USA showing all undergraduate neuroscience degree programs in public and private universities (2012).
2. New Program of Study Curricular Request Forms for BCN and CMN Concentrations
3. Faculty Vitae (provided separately as appendix 3)
4. Financial Planning Form
5. Memos from Department Chairs Regarding Program Impact on Their Courses
6. Memo on Library holding from Dean of Libraries



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## Appendix 4

### Financial Planning Form

MCIN UNDERGRADUATE MAJOR - EXPENSE/RETURN FORECAST (12/19/2012)

Enrollment Year Fiscal Year	Y0 FY14	Y1 FY15	Y2 FY16	Y3 FY17	Y4 FY18	Y5 FY19	Out years BASE BUDGET THEREAFTER
<b>TOTAL EXPENSES</b>							
PROVOST \$82,750 Recruitment		\$ 397,673	\$ 700,693	\$ 879,096	\$ 832,932	\$ 884,922	\$ 399,836
PROVOST 1.0 FTE Faculty		\$ 200,000	\$ 200,000	\$ 200,000	\$ -	\$ -	
PROVOST 0.5 FTE Instructor							
CNS 0.5 FTE Faculty							
CNS 1 GRA		\$ 98,837	\$ 250,346	\$ 339,548	\$ 416,466	\$ 442,461	\$ 200,000
CVMBS 0.5 FTE Faculty		\$ 98,837	\$ 250,346	\$ 339,548	\$ 416,466	\$ 442,461	\$ 200,000
CVMBS \$52,200 MCIN Base							
CVMBS 1 GRA							
<b>TOTAL RETURN</b>		\$ 625,630	\$ 1,304,260	\$ 2,039,280	\$ 2,834,600	\$ 2,955,240	
FINANCIAL AID		\$ 125,126	\$ 260,852	\$ 407,856	\$ 566,920	\$ 591,048	
PROVOST		\$ 250,252	\$ 521,704	\$ 815,712	\$ 1,133,840	\$ 1,182,096	
CNS		\$ 125,126	\$ 260,852	\$ 407,856	\$ 566,920	\$ 591,048	
CVMBS		\$ 125,126	\$ 260,852	\$ 407,856	\$ 566,920	\$ 591,048	
<b>Annual Central Admin Cash Balance</b>		50,252	321,704	615,712	1,133,840	1,182,096	
<b>Cumulative Central Admin Cash balance</b>	-87,750	-32,498	289,206	904,918	2,038,758	3,220,854	
Annual CNS		26,289	10,506	68,308	150,454	148,587	
Cumulative CNS		26,289	36,795	105,103	255,557	404,144	
Annual CVMBS		26,289	10,506	68,308	150,454	148,587	
Cumulative CVMBS		26,289	36,795	105,103	255,557	404,144	

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**Appendix 5****Memos From Departments Concerning Programmatic Impact of New Neuroscience Degree****Biochemistry and Molecular Biology****Biomedical Sciences****Chemistry****LIFE Core****Mathematics****Microbiology, Immunology and Pathology****Physics****Psychology****Statistics**

**Biochemistry**

August 16, 2010

Jim Bamberg, PhD  
Department of Biochemistry & Molecular Biology  
Colorado State University

Department of Biochemistry and  
Molecular Biology  
1870 Campus Delivery  
Fort Collins, Colorado 80523-1870  
<http://www.bmb.colostate.edu>

Dear Jim,

Your proposed curriculum in Cell and Molecular Neurosciences looks very comprehensive and exciting. The impact on courses taught by members of the faculty in the Department of Biochemistry and Molecular Biology will, of course, depend very strongly on the actual numbers of new students attracted to the new program. From your estimates for the size of the major, I expect that the core BMB lecture courses (BC401, 403, and 465) will be impacted primarily in the availability of classrooms with the seating capacities required to accommodate the increased class sizes. The course that will see the most significant impact will be the Biochemistry laboratory course (BC404), which can only accommodate increased numbers of students by adding new sections (one additional section for the ~20 new students projected). Since this is a project-oriented course, adding this new section will require that we add one half-time instructor, or equivalent, for one semester. With the design of the rooms available in Yates, adding this one section will also require that we outfit an additional teaching lab with equipment that are essential to the experiments that are part of the teaching syllabus. We estimate this to be ~\$30,000 the first year, with recurring funds to maintain the equipment in subsequent years.

I believe that these costs could be easily justified with the funding model that you have proposed to initiate and sustain the new major. You are to be commended on your work to develop this new major. I think that this is a timely major for CSU to institute and one that has the potential to attract a new cohort of highly qualified students regionally and nationally to the Fort Collins campus, and fully support your efforts on behalf of these students.

Sincerely,

A handwritten signature in black ink, appearing to read "P. Shing Ho".

P. Shing Ho, PhD  
Professor and Chair

**Chemistry**

New B.S. in neuroscience degree

**Subject:** New B.S. in neuroscience degree**From:** Alan Kennan <kennan@lamar.colostate.edu>**Date:** Sat, 07 Aug 2010 10:34:03 -0600**To:** James.Bamberg@colostate.edu

Hi Jim.

Ellen asked me to take a look at the impact to Chemistry of the new B.S. in neuroscience degree. Since all the Chem courses are required for both concentrations, it's my understanding that we're looking at an increase of roughly 40 students / year.

Based on current enrollments, I'm pretty sure we can absorb this increase in the general chemistry sequence (Chem 111/112/113/114). The percentage increase in these courses would range from 2.3% to 5.0%, and there is historically some wiggle room even in the lab courses. Though that wiggle room appears to have evaporated this fall, but that's another story. :) Plus at least some of these kids would likely wind up taking Gen Chem anyway, if they had to slot into one of the existing majors.

In the organic sequence (Chem 341/343/344) this would be more of a spike, and it's not as obvious that people would have to take those courses in a different major. The percentage increase ranges from 7.2% to 11.8%, with the high end in the resource-intensive lab course (Chem 344). An increase of 40 students amounts to about two more lab sections, which would require two TA-semester to run. With current stipend and tuition rates, that comes out at about \$18K.

Let me know if you need more info.

cheers.

ajk

--

Alan I. Kennan  
Associate Professor of Chemistry  
Colorado State University  
Fort Collins, CO 80523

<http://www.chem.colostate.edu/~akennan>  
Office: G313 Chemistry  
Phone: (970) 491-6046  
FAX: (970) 491-1801  
email: [kennan@lamar.colostate.edu](mailto:kennan@lamar.colostate.edu)

## LIFE

about blank

**From:** James R. Bamburg [mailto:James.Bamburg@ColoradoState.edu]  
**Sent:** Monday, August 09, 2010 1:41 PM  
**To:** Lamborn, Alan  
**Subject:** Re: FW: FW: Phase II for BS degree in neuroscience

Will do. Jim

On 8/9/2010 1:09 PM, Lamborn, Alan wrote:

I think the key thing is to include the issues that need to be addressed so that the implications of any decision to move forward are clearly itemized and understood.

---

**From:** James R. Bamburg [mailto:James.Bamburg@ColoradoState.edu]  
**Sent:** Monday, August 09, 2010 1:07 PM  
**To:** Lamborn, Alan  
**Cc:** Steingraeber, David (EID)  
**Subject:** Re: FW: FW: Phase II for BS degree in neuroscience

Dear Alan and Dave: Thank you for the analysis of the LIFE course issues. I am fully aware of most of these issues, having to deal with them in BMB. I don't think we will have any problems in dealing with support for GTAs for added sections since I have built in three GTA semesters for the LIFE core into the Phase II budget request. However, there is little I can do in the Phase II proposal about some of the other major issues with teaching space and classroom size issues, other than adding some fuel to the fire to get us moving forward on these items. Because my analysis and yours seem to be the same, I am not sure we need to meet further to discuss these issues unless you feel that there is something I can add in our Phase II proposal that will help move us forward on space issues.

Cheers, JIM

On 8/9/2010 12:58 PM, Lamborn, Alan wrote:

Here are the issues with the LIFE courses.

---

**From:** David Steingraeber [mailto:]  
**Sent:** Monday, August 09, 2010 1:53 PM  
**To:** Lamborn, Alan  
**Subject:** Re: FW: Phase II for BS degree in neuroscience

hi Alan-

I've reviewed the proposed curriculum. All students in the program (i.e., both tracks) would be required to take LIFE 102, followed by LIFE 201 & 203 (Genetics & lab) and LIFE 210 & 212 (Cell Bio. & lab). The projected enrollment of 40-50 students per year (with ~40 being new students) would require adding 2 new lab sections to each of the required lab courses (LIFE 102, 203, & 212); since a normal GTA teaching load for these classes is 2 sections/semester, this would require funds for 3 additional 1-semester GTA positions. The added enrollment in lecture sections/courses (LIFE 102 lecture, LIFE 201, LIFE 210) could likely be handled with current staffing, though it might necessitate moving LIFE 201 and 210 to larger lecture rooms.

There are additional capacity issues that need to be addressed, however. The curriculum specifies that students take LIFE 102 in the Fall semester of Freshman year, but (as you know) we're already at the practical limit for the number of lab sections of LIFE 102 in the Fall. Adding more lab sections in the Fall would require a major revamping of the way labs are scheduled and an expansion of the lab rooms/facilities available to us, as well as increased support for lab preparation and coordination. I fully realize that the curriculum requires that students take LIFE 102 "early" because it is a prerequisite for many classes that

follow in short order. However, freeing up space for these students in the Fall semester is likely only if we succeed in our current effort to have other programs wait until Spring semester for their students to enroll in LIFE 102.

Similarly, LIFE 212 (Cell Biology Lab) is currently at/near capacity with regard to the lab facilities available to us, so adding 2 lab sections under the current schedule/set-up might pose problems. (LIFE 203, Genetics Lab, is not constrained in this way because it is not required for Biomedical Science majors and therefore has fewer lab sections.) To accommodate additional sections of LIFE 212, perhaps we should consider whether LIFE 210 & 212 need to expand and be offered both Fall and Spring semesters, rather than Fall only. Obviously, such an expansion would require additional resources.

Let me know if you have questions on any of this.

Dave

At 09:39 AM 8/9/2010, you wrote:

Dave,

Would you take a look at this from the perspective of its likely impact on courses in the LIFE core.

Thanks,

Alan

**Mathematics**

Re: Phase II for BS degree in neuroscience

**Subject:** Re: Phase II for BS degree in neuroscience  
**From:** Simon Tavenor <tavenor@math.colostate.edu>  
**Date:** Fri, 6 Aug 2010 05:22:42 -0600 (MDT)  
**To:** "James R. Bamburg" <James.Bamburg@ColoState.edu>

Dear Jim,

Using current enrollment numbers for Fall 2010, we have two large sections of MATH155 with 70 students in each which are full, and six small sections with 30 students in each which are also full. We have a further 20 students on wait lists. Theoretically we could absorb 40 additional students by running three (or four) large sections and five (or four) small sections **\*\*IF\*\*** we can more large rooms and **\*\*IF\*\*** we can find suitable instructors. The small sections are taught by GTAs, the large sections are taught by faculty or experienced instructors. The rooms are probably the more difficult issue of the two.

We currently have 32 students enrolled in MATH255. An additional 20 students (since only students in the CMN option take this class) would ideally require a second section. This is a class that I feel would suffer severely if taught in a class of over 50 students. Not impossible of course, but this is a course which really benefits from a "small" class setting.

I am on vacation this week but will be back in Fort Collins on Monday if you feel we should meet.

Yours sincerely,  
 Simon

I have attached a summary of the proposed curriculum and ask that you look at the courses offered through your department for what potential impact our program would have on enrollment if we considered 40 new students per year (our actual goal is 50 students per year but in reality at least 10 would be existing students changing majors from one that already required most of these classes). In evaluating the impact for upper division courses, please keep in mind that we anticipate a split of about 60/40 for the students taking the Behavioral and Cognitive (green) versus the Cell and Molecular (red) concentrations.



**Physics**

RE: neuroscience BS degree

**Subject:** RE: neuroscience BS degree  
**From:** "Robinson, Raymond" <Raymond.Robinson@ColoState.EDU>  
**Date:** Mon, 16 Aug 2010 22:05:59 +0000  
**To:** "Bamburg, James (EID)" <James.Bamburg@ColoState.EDU>, John Harton  
 <harton@lamar.colostate.edu>  
**CC:** "John Harton (Contact)" <John.Harton@ColoState.EDU>, robinson <robinson@lamar.colostate.edu>

Jim,

In our estimate, we assumed 50 students Fall and 50 students Spring. If the enrollment is 50 and 20 then your 1.5 sem of GTA is, of course, correct.

Sincerely,

Steve

From: James R. Bamburg [James.Bamburg@ColoState.EDU]  
 Sent: Monday, August 16, 2010 4:01 PM  
 To: John Harton  
 Cc: John Harton (Contact); robinson  
 Subject: Re: neuroscience BS degree

Hi John and Steve: I estimated the impact as requiring two lab sections of PH 121 (50 new students but a few of whom elect PH141) and one section of PH 122 (about 20 new students, or about one section). To me these translate into one full semester and one half semester GTA, which is what I have included in my budget. If you think that the second half of the one GTA is justifiable, can you send me the details of why so that I can include it in my analysis? I am fully aware that partial support for a GTA may not provide the required body, but if I round up for all of the partials GTA positions we require for all of the ancillary courses, it amounts to another 5-6 GTAs. I believe that some GTAs can be provided for freshman courses in different departments from interdisciplinary program pools (e.g. CMB, MCIN, SIME) and thus we can actually cover half time positions with a real body. If there is some reason that this won't work in physics, please explain this in your response. If you are satisfied with the 1.5 sem of GTA support and feel that this is what is justified for the added load, then please just acknowledge this in an email. Thanks for your response and I hope that what I have written up above is clear.  
 Cheers. JHB

On 8/16/2010 2:44 PM, John Harton wrote:

Hello Jim,

Having discussed this with Associate Chair Steve Robinson, it seems clear that the impact on Physics overall would be at the level of a full TA plus the associated tuition.

Sincerely,

John Harton

On 8/15/10 12:03 PM, James R. Bamburg wrote:

Dear Department Chair: I am in the final stages of preparing the Phase II proposal for the new BS degree in neuroscience and I need to get your

**Psychology**

RE: neuroscience BS degree

**Subject:** RE: neuroscience BS degree  
**From:** "Chavez, Ernest" <Ernest.Chavez@ColoState.EDU>  
**Date:** Mon, 16 Aug 2010 18:08:18 -0000  
**To:** "delosh@colostate.edu" <delosh@ColoState.EDU>, "Bamburg, James (EID)" <James.Bamburg@ColoState.EDU>  
**CC:** "Tobiassen Baitinger, D" <D.Tobiassen\_Baitinger@ColoState.EDU>

I agree

-----Original Message-----

From: Edward DeLosh [<mailto:delosh@colostate.edu>]  
 Sent: Monday, August 16, 2010 12:09 PM  
 To: Bamburg, James (EID)  
 Cc: Chavez, Ernest; Tobiassen Baitinger, D  
 Subject: RE: neuroscience BS degree

I would say that 1.5 GTAs would be needed if we ended up at the top end of the estimated increase in number of students, but yes, in all likelihood the full-time GTA (two semesters) should be enough.

Ed

-----Original Message-----

From: James R. Bamburg [<mailto:James.Bamburg@ColoState.edu>]  
 Sent: Monday, August 16, 2010 10:24 AM  
 To: [delosh@ColoState.edu](mailto:delosh@ColoState.edu)  
 Cc: 'Chavez, Ernest'; D.Tobiassen Baitinger  
 Subject: Re: neuroscience BS degree

Dear Ed and Ernest: Thank you for the course analysis. I already estimated that we would require one additional GTA (2 semesters) for the advanced Psych labs. Given that some of the students who currently take these labs might be likely to be among the few who elect the neuroscience major, I think the impact would be reduced a bit. Given that caveat, do you think that one full time GTA would probably be sufficient to cover the increased sections or will we require 1.5 GTA (3 semesters worth)? Cheers, Jim

On 8/16/2010 10:16 AM, Edward DeLosh wrote:

Ernie and Jim,

If the numbers turn out as projected, there could be an impact on our lab courses. Based on the estimates given, we're looking at 50 students total per year x 60% in the BSN concentration = 30 additional students per year that could impact our courses. I believe we can absorb this number in our lecture courses, since we offer at least two large sections of each per year.

(meaning we'd only be adding 15 students per section at most). However, since our lab courses are capped at 15 students each, an additional 30 students per year would mean that we'd need to offer two additional sections

per year (probably one per semester) for each of the following lab courses:

PSY452 Cognitive Psych Lab, PSY455 Biopsych Lab, PSY457 S&P Lab.

Regards,

RE: neuroscience BS degree

Ed

-----Original Message-----

From: Chavez, Ernest [mailto:Ernest.Chavez@ColoState.EDU]

Sent: Monday, August 16, 2010 9:18 AM

To: Bamburg, James (EID)

Cc: Ed DeLosh

Subject: RE: neuroscience BS degree

Hi Jim

Sorry about the delay. I have asked Ed DeLosh to respond to your request, although there appears to be no problem with our classes.

-----Original Message-----

From: James R. Bamburg [mailto:James.Bamburg@ColoState.edu]

Sent: Sunday, August 15, 2010 12:04 PM

To: horton@amar.colostate.edu; Chavez, Ernest; Hoover, Edward

Subject: neuroscience BS degree

Dear Department Chair: I am in the final stages of preparing the Phase II proposal for the new BS degree in neuroscience and I need to get your input.

into the impact of our major on required courses within your program. Only with your help can I make sure that we have asked for adequate support for departments impacted by our requirements. I again attach a copy of the curriculum and ask that you get back to me ASAP with information on how

our

major, with approximately 50 students admitted each year and distributed about 60% in the Behavioral and Cognitive Neuroscience concentration and 40%

in Cell and Molecular Neuroscience concentration will impact your courses. In other words, will additional class sections and GRAs be required?

Thanks for your input. JIM

--

James R. Bamburg, Professor

Department of Biochemistry and Molecular Biology 1870 Campus Delivery  
Colorado State University Fort Collins, CO 80523-1870

Tel: 970-491-6096

FAX: 970-491-0494

email: [James.Bamburg@ColoState.edu](mailto:James.Bamburg@ColoState.edu)

Former Director, Molecular, Cellular and Integrative Neurosciences  
970-491-0425

--

James R. Bamburg, Professor

Department of Biochemistry and Molecular Biology  
1870 Campus Delivery  
Colorado State University  
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Tel: 970-491-6096

FAX: 970-491-0494

email: [James.Bamburg@ColoState.edu](mailto:James.Bamburg@ColoState.edu)

Former Director, Molecular, Cellular and Integrative Neurosciences  
970-491-0425

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**Statistics**

Re: Phase II for BS degree in neuroscience

**Subject:** Re: Phase II for BS degree in neuroscience**From:** Jay Breidt <jbreidt@gmail.com>**Date:** Wed, 11 Aug 2010 15:19:04 -0600**To:** "James Bamburg" <James.Bamburg@colostate.edu>

Hi Jim,

Sorry for the delay in replying. The impact of 40 new students on Statistics would be the need to open one new section of stat301 or 307 per year, since all of our other sections are currently very over-subscribed. We can often cover one such course with 1/2 of one GTA line. Looks like this issue is a few years out, given the phase-in plan.

I'd be happy to meet to discuss further.

Best,

Jay

On Mon, Aug 2, 2010 at 12:53 PM, James R. Bamburg  
 <James.Bamburg@colostate.edu> wrote:

Dear Department Chair:

I am moving forward in the preparation of a phase II document for a new BS degree in Neuroscience. As part of the Phase II proposal I need to document the "collateral expenses" that must be taken into account in order to offer this academic program. (E.g., other than ABCC (core) courses, how will other department's teaching loads and facilities be affected by inclusion of their courses in the proposed curriculum.

The Phase II asks for us to provide a letter from other units indicating whether they would be able to "absorb" the projected number of students into already existing sections or whether they will need to add sections and if there is a need to add, can this be done with existing resources?

I have attached a summary of the proposed curriculum and ask that you look at the courses offered through your department for what potential impact our program would have on enrollment if we considered 40 new students per year (our actual goal is 50 students per year but in reality at least 10 would be existing students changing majors from one that already requires most of these classes). In evaluating the impact for upper division courses, please keep in mind that we anticipate a split of about 60/40 for the students taking the Behavioral and Cognitive (green) versus the Cell and Molecular (red) concentrations.

If you feel that the numbers can be absorbed into existing courses, I don't think we need to meet but could you write me a letter stating this for inclusion in the Phase II proposal? If you are pretty certain that the enrollments will require additional sections, please let me know so that we can set up a time in the next few weeks to have a face-to-face meeting to discuss the resources that will be required for us to move forward. I do anticipate phasing-in the major over a few year period so that in the first year of operation it should only impact the first year courses.

## Appendix 6

### Analysis of Library Resources for Proposed Undergraduate Degree Program in Neurosciences

#### Analysis

The Colorado State University Libraries currently collect materials to support graduate level curriculum in the neurosciences. At the doctoral level, CSU offers degrees with an emphasis in the neurosciences through the Perceptual and Brain Sciences (formerly Behavioral Neurosciences) program from the Department of Psychology and the interdisciplinary Molecular, Cellular and Integrative Neurosciences Program. The materials collected for these existing degree programs, including journals, databases, and monographs, should be adequate to support an additional undergraduate degree in the neurosciences. This assessment is based on currently available resources and campus needs, and it is impossible predict how the information landscape of the neurosciences will change as new resources and technologies become available. Library support of all university programs needs to be reevaluated at regular intervals.

Although the Libraries have a generally strong collection of materials in the neurosciences, there are some gaps in the journal collection. Thanks to the CSU Libraries' robust Interlibrary Loan system, articles are readily available from these titles, but the Libraries should consider adding the following high-impact (as indicated by Journal Citation Reports) journal subscriptions to these titles as funding permits.

Titles to add to the collection (Pricing based on list price in Ulrich's. Collections unit is researching CSU-specific pricing):

<u>ISSN</u>	<u>Journal Title</u>	<u>Price</u>
1871-5273	C N S & Neurological Disorders	\$1,150
1471-0048	Nature Reviews. Neuroscience	\$3,060
1350-7540	Current Opinion in Neurology	\$1,156
0893-133X	Neuropsychopharmacology	\$2,697
0271-678X	Journal of Cerebral Blood Flow and Metabolism	\$1,195

TOTAL: \$9,258

AUG 16 2013 68

1 of 11

## NEW/MAJOR/MINOR PROGRAMS OF STUDY-CURRICULAR REQUESTS

CONTACT PLEASE PRINT: NAME James R. Bamburg\_\_ EMAIL James.Bamburg@colostate.edu\_\_ PHONE 491-6096\_\_  
(REQUIRED)CHECK THE APPROPRIATE BOX ON THE FAR LEFT. See *Curricular Policies and Procedures Handbook*, available at <http://www.colostate.edu/orgs/ucc> for instructions

## ADDS

☐ ADD a new department and/or college. (Complete Section I-Column B and Section II)  
☒ ADD a new degree or major or concentration or option or minor or interdisciplinary studies program (Complete Section I-Column B, Section II, and Section III-Column B)

## MAJOR CHANGES

☐ CHANGE the name of an existing department and/or college (Complete Section I-Column A, only changed item(s) in Section I-Column B, and Section II)  
☐ CHANGE the name of a degree or major or concentration or option or minor or interdisciplinary studies program (Complete Section I-Column A, only changed item(s) in Section I-Column B, and Section II)  
☐ CHANGE the curriculum requirements of an approved major or concentration or option or minor or interdisciplinary studies program involving a sum total of 7 or more credits. (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B)  
☐ CHANGE AUCC Category 4 requirements of an approved major or concentration. (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B)  
☐ DROP a degree or major or concentration or option or minor or interdisciplinary studies program and requirements (Complete Section I-Column A and Section II)

## MINOR CHANGES

☐ CHANGE the curriculum requirements of an approved major or concentration or option or minor or interdisciplinary studies program involving a sum total of less than 7 credits (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B)  
☐ CHANGE courses and/or group requirements from freshman/sophomore year to junior/senior year or vice versa in an approved major or concentration or option or minor or interdisciplinary studies program (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B)

## SECTION I

<b>A. PRESENT NAME</b> <u>Molecular, Cellular, and Integrative Neuroscience SAU</u>	<b>B. REQUESTED NAME</b> <u>Office of the Provost</u> <u>Special Academic Unit</u> <u>Neuroscience</u> <u>Behavioral and Cognitive Neuroscience</u>
<b>COLLEGE</b> _____	
<b>DEPARTMENT</b> _____	
<b>MAJOR</b> _____	
<b>UNDERGRADUATE CONCENTRATION/GRADUATE SPECIALIZATION</b> _____	
<b>OPTION</b> _____	
<b>MINOR</b> _____	
<b>INTERDISCIPLINARY STUDIES PROGRAM</b> _____	
<b>DEGREE</b> <u>B.S. in Neuroscience</u>	

EFFECTIVE DATE (TERM AND YEAR) REQUESTED Fall, 2014

## SECTION II-JUSTIFICATION FOR REQUEST

CSU has a strong research base and national reputation in neuroscience through our graduate MCIN program. We already attract the attention of a number of students who might want to major in this important discipline. It is anticipated that the proposed program will draw students who would not otherwise come to CSU. There are only a few public, comprehensive research universities nationwide that offer undergraduate neuroscience majors, and none in states nearby Colorado. See Phase II document for more details.

## SECTION III (SEE PG. 2)

## SECTION IV-SIGNATURES OF AFFECTED DEPARTMENTS (SEE PG. 3)

## CHANNELS FOR APPROVAL

Department Head	<u>[Signature]</u>	DATE	<u>7-11-13</u>
Chairperson	<u>[Signature]</u>		
Chairperson College Curriculum Committee	<u>[Signature]</u>		<u>7-25-13</u>
Dean of College	<u>Simon J. Walker</u>		<u>7/25/13</u>

\*Signature indicates approval and a commitment of resources

## CURRICULUM &amp; CATALOG USE

## Approval Date

Comm. On Scholarship, Research and Graduate Education (CoSRGE)

University Curriculum Committee

Faculty Council

Approved Effective Date

Call 1-1451, Curriculum and Catalog Administration, for information

## SECTION III: LISTING OF CURRICULUM REQUIREMENTS

A. LIST COMPLETE CURRENT REQUIREMENTS (Please contact Curriculum and Catalog to request a current program of study.)		B. EITHER LIST COMPLETE NEW PROGRAM OR ONLY PROPOSED CHANGES (CHANGES, DROPS, AND ADDS). (For examples, see Appendices in the Curricular Policies and Procedures Handbook.) INCLUDE: Course prefix, number, title, and number of credits. Note superscript "P" after course number if course has a prerequisite.	
FIRST YEAR	CREDITS	FIRST YEAR	CREDITS
		NB 192 <sup>P</sup> Introductory Seminar	1
		PSY 100 General Psychology (AUCC 3C)	3
		CHEM 111 <sup>P</sup> General Chemistry I (AUCC 3A)	4
		CHEM 112 <sup>P</sup> General Chemistry Laboratory I (AUCC 3A)	1
		CHEM 113 <sup>P</sup> General Chemistry II	3
		CHEM 114 <sup>P</sup> General Chemistry Laboratory II	1
		LIFE 102 <sup>P</sup> Attributes of Living Systems (AUCC 3A)	4
		LIFE 201B <sup>P</sup> Intro. Genetics-Molecular/Immunological/Developmental	3
		LIFE 203 <sup>P</sup> Introductory Genetics Laboratory	2
		MATH 155 <sup>P</sup> Calculus for Biological Scientists I (AUCC 1B)	4
		CO 150 <sup>P</sup> College Composition (AUCC 1A)	3
		Arts/Humanities <sup>1</sup> (AUCC 3B)	3
		<b>TOTAL</b>	<b>32</b>
SECOND YEAR	CREDITS	SECOND YEAR	CREDITS
		CO 300 <sup>P</sup> Writing Arguments <sup>1</sup> (AUCC 2B)	3
		OR	
		CO 301B <sup>P</sup> Writing in the Disciplines-Sciences <sup>1</sup> (AUCC 2B)	3
		LIFE 210 <sup>P</sup> Introductory Eukaryotic Cell Biology	3
		LIFE 212 <sup>P</sup> Introductory Cell Biology Laboratory	2
		CHEM 341 <sup>P</sup> Modern Organic Chemistry I	3
		CHEM 343 <sup>P</sup> Modern Organic Chemistry II	3
		CHEM 344 <sup>P</sup> Modern Organic Chemistry Laboratory	2
		PH 121 <sup>P</sup> General Physics I	5
		OR	
		PH 141 <sup>P</sup> Physics for Scientists and Engineers I	5
		PSY 252 <sup>P</sup> Mind, Brain, and Behavior	3
		PSY 250 <sup>P</sup> Research Methods in Psychology	4
		Arts/Humanities <sup>1</sup> (AUCC 3B)	3
		<b>TOTAL</b>	<b>31</b>
THIRD YEAR	CREDITS	THIRD YEAR	CREDITS
		STAT 301 <sup>P</sup> Introduction to Statistical Methods	3
		OR	
		STAT 307 <sup>P</sup> Introduction to Biostatistics	3
		BC 351 <sup>P</sup> Principles of Biochemistry	4
		BMS 300 <sup>P</sup> Principles of Human Physiology	4
		BMS 345 <sup>P</sup> Functional Neurophysiology	4
		PSY 352 <sup>P</sup> Learning and Memory	3
		OR	
		PSY 452 <sup>P</sup> Cognitive Psychology	3
		PSY 458 <sup>P</sup> Cognitive Neuroscience (AUCC 4B)	3
		PSY 459 <sup>P</sup> Cognitive Neuroscience Laboratory (AUCC 4A)	2
		Global and Cultural Awareness <sup>2</sup> (AUCC 3E)	3
		Historical Perspectives <sup>3</sup> (AUCC 3D)	3
		<b>TOTAL</b>	<b>30</b>
FOURTH YEAR	CREDITS	FOURTH YEAR	CREDITS
		BMS 325 <sup>P</sup> Cellular Neurobiology	3
		PSY 454 <sup>P</sup> Biological Psychology	3
		PSY 455 <sup>P</sup> Biological Psychology Laboratory	2
		PSY 456 <sup>P</sup> Sensation and Perception (AUCC 4B)	3
		PSY 457 <sup>P</sup> Sensation and Perception Laboratory	2
		NB 399 <sup>P</sup> Thesis Preparation	1
		NB 493 <sup>P</sup> Senior Seminar (AUCC 4C)	1
		NB 495 <sup>P</sup> Thesis (AUCC 4A, 4C)	3
		Electives <sup>4</sup>	10
		<b>TOTAL</b>	<b>28</b>
		<b>PROGRAM TOTAL = 120</b>	

<sup>P</sup> This course has at least one prerequisite. Check the Courses of Instruction section of the catalog (<http://catalog.colostate.edu>) to see the course requirements.

<sup>1</sup> Select from list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediates (L\* 200 and L\* 201) foreign language courses.

<sup>3</sup> Select from list of courses in category 3D in the AUCC.

<sup>2</sup> First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course to fulfill the AUCC category 2B requirement.

<sup>4</sup> Select from list of courses in category 3E in the AUCC.

NOTE: Departmental Signatures were collected on different days and on different forms starting in fall 2012. The attached set has one original signature from each chair on one of the 4 forms provided.



**SECTION IV - SIGNATURES OF AFFECTED DEPARTMENTS**  
(Required before consideration by University Curriculum Committee)

Affected departments include any department outside the home department, whose course is used in the program. Affected departments might also include other departments offering a program with similar or overlapping content.

This proposal for a curricular change or addition of a program of study has been reviewed and agreed to by the following departments affected by the changes. The agreements are conditional upon the availability of the financial resources requested in the Phase II plan.

Signature	<i>[Signature]</i>	Biochemistry and Molecular Biology	9/18/2012
Signature		Department	Date
		Chemistry	
Signature	<i>[Signature]</i>	Department	Date
		Mathematics	9/18/12
Signature	<i>[Signature]</i>	Department	Date
		Physics	13 May 2013
Signature	<i>[Signature]</i>	Department	Date
		Psychology	8/31/12
Signature	<i>[Signature]</i>	Department	Date
		Statistics	8/27/12
Signature	<i>[Signature]</i>	Department	Date
		LIFE CORE	9/19/2012
Signature	<i>[Signature]</i>	Department	Date
		Biomedical Sciences	5/13/13
Signature		Department	Date
		Microbiology, Immunology and Pathology	
Signature		Department	Date
Signature		Department	Date
Signature		Department	Date

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Signature	<i>[Signature]</i>	Biochemistry and Molecular Biology	9/18/2012
Signature		Department	Date
		Chemistry	
Signature		Department	Date
	<i>[Signature]</i>	Mathematics	9/18/12
Signature		Department	Date
		Physics	
Signature		Department	Date
	<i>[Signature]</i>	Psychology	8/31/12
Signature		Department	Date
	<i>[Signature]</i>	Statistics	8/27/12
Signature		Department	Date
	<i>[Signature]</i>	LIFE CORE	9/19/12
Signature		Department	Date
		Biomedical Sciences	
Signature		Department	Date
		Microbiology, Immunology and Pathology	
Signature		Department	Date
Signature		Department	Date
Signature		Department	Date

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<b>Biochemistry and Molecular Biology</b>		
Signature _____	Department _____	Date _____
<b>Chemistry</b>		
Signature _____	Department _____	Date _____
<i>C. Michael Elliott</i>	<i>Mathematics (chemistry)</i>	<i>9/20/12</i>
Signature _____	Department _____	Date _____
<b>Physics</b>		
Signature _____	Department _____	Date _____
<i>[Signature]</i>	<i>Psychology</i>	<i>8/31/12</i>
Signature _____	Department _____	Date _____
<i>[Signature]</i>	<i>Statistics</i>	<i>8/27/12</i>
Signature _____	Department _____	Date _____
<b>LIFE CORE</b>		
Signature _____	Department _____	Date _____
<b>Biomedical Sciences</b>		
Signature _____	Department _____	Date _____
<b>Microbiology, Immunology and Pathology</b>		
Signature _____	Department _____	Date _____
Signature _____	Department _____	Date _____
Signature _____	Department _____	Date _____

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This proposal for a curricular change or addition of a program of study has been reviewed and agreed to by the following departments affected by the changes. The agreements are conditional upon the availability of the financial resources requested in the Phase II plan.

**Biochemistry and Molecular Biology**

Signature	Department	Date
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**Chemistry**

Signature	Department	Date
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**Mathematics**

Signature	Department	Date
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**Physics**

Signature	Department	Date
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**Psychology**

Signature	Department	Date
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**Statistics**

Signature	Department	Date
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**LIFE CORE**

Signature	Department	Date
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**Biomedical Sciences**

Signature	Department	Date
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**Microbiology, Immunology and Pathology**

Signature	Department	Date
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Signature	Department	Date
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Signature	Department	Date
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Draft of Proposed Catalog Copy- from J. Bamburg, June 7, 2013

## Major in Neuroscience

The Neuroscience Special Academic Unit is an interdisciplinary undergraduate degree-granting program with faculty in five different colleges and ten departments. Two different concentrations are offered as programs of study at the undergraduate level: Behavioral and Cognitive Neuroscience and Cell and Molecular Neuroscience. Both concentrations have a strong foundation in mathematics, physics, chemistry and biological sciences that utilize a common core for the first two years, differing in only a single course for each concentration, thus making it easy to switch between concentrations if a student's interest changes during the first two years. Both concentrations require completion of an undergraduate thesis, providing significant opportunities for experiential learning in research laboratories in which they work closely with faculty, and which sometimes lead to authorship of original publications. Electives allow students in one concentration to acquire breadth and depth in the other area, if desired.

The Behavioral and Cognitive Neuroscience concentration integrates an understanding of neuroanatomy with the mechanisms of sensation/perception and learning/memory, generally applied to human behavior. Its focus is more at the functional level of neuronal systems and networks. It differs from classical psychology in providing a more in depth cellular and molecular basis for understanding behavior and neurological disorders that influence behavior. Graduates of this concentration are well prepared for many graduate and professional degree programs in health professions, as well as for careers within hospitals, non-profit disease oriented foundations, and private sector organizations in either research-related or human resource service-related positions.

The Cell and Molecular Neuroscience concentration integrates neuroanatomy with the cellular and molecular basis of nervous system function. Its focus is more at the molecular level in understanding specific cellular based processes in neurons and glia. It differs from degree programs in biochemistry or biomedical sciences through its strong focus on the nervous system. Required courses in microbiology, immunology, biochemistry and advanced cell biology provide an excellent breadth in background for those students interested in pursuing careers in medicine or biomedical research through graduate/professional schools. However, graduates of this concentration also should be well qualified for technical positions in academic, government or private sector laboratories doing cell and molecular research, whether or not it is applied to the nervous system.

## Learning Outcomes

Students will obtain:

- A command of the basic concepts of chemistry, physics, biology, biochemistry, molecular biology, and cellular biology as well as a more in depth understanding of the structure and function of the nervous system
- An understanding of how the brain works, from molecules to the mind, and how its function becomes disrupted for some diseases and brain injuries.

**Molecular, Cellular, and Integrative Neuroscience Special Academic Unit**  
**Major in Neuroscience**  
**Behavioral and Cognitive Neuroscience Concentration**

Effective Fall 2014

(The entire program is shown.)

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
<b>FRESHMAN</b>			
CHEM 111 <sup>P</sup>	General Chemistry I	4	3A
CHEM 112 <sup>P</sup>	General Chemistry Laboratory I	1	3A
CHEM 113 <sup>P</sup>	General Chemistry II	3	
CHEM 114 <sup>P</sup>	General Chemistry Laboratory II	1	
CO 150 <sup>P</sup>	College Composition	3	1A
LIFE 102 <sup>P</sup>	Attributes of Living Systems	4	3A
LIFE 201B <sup>P</sup>	Introductory Genetics: Molecular, Immunological, Developmental	3	3A
LIFE 203 <sup>P</sup>	Introductory Genetics Laboratory	2	
MATH 155 <sup>P</sup>	Calculus for Biological Scientists I	4	1B
NB 192 <sup>P</sup>	Introductory Neuroscience Seminar	1	
PSY 100	General Psychology	3	3C
	Arts and Humanities <sup>1</sup>	3	3B
	<u>TOTAL</u>	<u>32</u>	
<b>SOPHOMORE</b>			
CHEM 341 <sup>P</sup>	Modern Organic Chemistry I	3	
CHEM 343 <sup>P</sup>	Modern Organic Chemistry II	3	
CHEM 344 <sup>P</sup>	Modern Organic Chemistry Laboratory	2	
CO 300 <sup>P</sup>	Writing Arguments	3	2
	<u>OR</u>		
CO 301B <sup>P</sup>	Writing in the Disciplines—Sciences	3	2
LIFE 210 <sup>P</sup>	Introductory Eukaryotic Cell Biology	3	
LIFE 212 <sup>P</sup>	Introductory Cell Biology Laboratory	2	
PH 121 <sup>P</sup>	General Physics I	5	3A
	<u>OR</u>		
PH 141 <sup>P</sup>	Physics for Scientists and Engineers I	5	3A
PSY 250 <sup>P</sup>	Research Methods in Psychology	4	
PSY 252 <sup>P</sup>	Mind, Brain, and Behavior	3	
	Arts and Humanities <sup>1</sup>	3	3B
	<u>TOTAL</u>	<u>31</u>	
<b>JUNIOR</b>			
BC 351 <sup>P</sup>	Principles of Biochemistry	4	
BMS 300 <sup>P</sup>	Principles of Human Physiology	4	
BMS 345 <sup>P</sup>	Functional Neuroanatomy	4	
NB 399 <sup>P</sup>	Thesis Preparation	1	
PSY 352 <sup>P</sup>	Learning and Memory	3	
	<u>OR</u>		
PSY 452 <sup>P</sup>	Cognitive Psychology	3	
PSY 458 <sup>P</sup>	Cognitive Neuroscience	3	4B
PSY 459 <sup>P</sup>	Cognitive Neuroscience Laboratory	2	4A
STAT 301 <sup>P</sup>	Introduction to Statistical Methods	3	
	<u>OR</u>		
STAT 307 <sup>P</sup>	Introduction to Biostatistics	3	
	Global and Cultural Awareness <sup>2</sup>	3	3E
	Historical Perspectives <sup>3</sup>	3	3D
	<u>TOTAL</u>	<u>30</u>	

Major in Neuroscience  
Behavioral and Cognitive Neuroscience Concentration

Page 2 of 2

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SEP 05 2013

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
<b>SENIOR</b>			
BMS 325 <sup>1</sup>	Cellular Neurobiology	3	
NB 493 <sup>1</sup>	Senior Seminar	1	4C
NB 499 <sup>1</sup>	Senior Thesis	3	4A, 4C
PSY 454 <sup>1</sup>	Biological Psychology	3	
PSY 455 <sup>1</sup>	Biological Psychology Laboratory	2	
PSY 456 <sup>1</sup>	Sensation and Perception	3	4B
PSY 457 <sup>1</sup>	Sensation and Perception Laboratory	2	
	Electives <sup>3</sup>	10	
	<u>TOTAL</u>	<u>27</u>	
<b>PROGRAM TOTAL = 120 credits</b>			

<sup>1</sup> This course has at least one prerequisite. Check the Courses of Instruction section of the catalog at <http://catalog.colostate.edu> to see the course prerequisites.

<sup>1</sup> Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L\* 200 and L\* 201) foreign language courses.

<sup>2</sup> Select from the list of courses in category 3E in the AUCC.

<sup>3</sup> Select from the list of courses in category 3D in the AUCC.

<sup>4</sup> Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper division.

AUG 16 2013 78

14/11

# NEW/MAJOR/MINOR PROGRAMS OF STUDY-CURRICULAR REQUESTS

CONTACT PLEASE PRINT: NAME James R. Bamburg EMAIL James.Bamburg@colostate.edu PHONE 491-6096  
(REQUIRED)

CHECK THE APPROPRIATE BOX ON THE FAR LEFT. See Curricular Policies and Procedures Handbook, available at <http://www.colostate.edu/orgs/ucc> for instructions.

## ADDS

- ☐ ADD a new department and/or college. (Complete Section I-Column B and Section II.)  
☒ ADD a new degree or major or concentration or option or minor or interdisciplinary studies program. (Complete Section I-Column B, Section II, and Section III-Column B.)

## MAJOR CHANGES

- ☐ CHANGE the name of an existing department and/or college. (Complete Section I-Column A, only changed item(s) in Section I-Column B, and Section II.)  
☐ CHANGE the name of a degree or major or concentration or option or minor or interdisciplinary studies program. (Complete Section I-Column A, only changed item(s) in Section I-Column B, and Section II.)  
☐ CHANGE the curriculum requirements of an approved major or concentration or option or minor or interdisciplinary studies program involving a sum total of 7 or more credits. (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B.)  
☐ CHANGE AUCC Category 4 requirements of an approved major or concentration. (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B.)  
☐ DROP a degree or major or concentration or option or minor or interdisciplinary studies program and requirements. (Complete Section I-Column A and Section II.)

## MINOR CHANGES

- ☐ CHANGE the curriculum requirements of an approved major or concentration or option or minor or interdisciplinary studies program involving a sum total of less than 7 credits. (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B.)  
☐ CHANGE courses and/or group requirements from freshman/sophomore year to junior/senior year or vice versa in an approved major or concentration or option or minor or interdisciplinary studies program. (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B.)

## SECTION I

A. PRESENT NAME	B. REQUESTED NAME
Molecular, Cellular, and Integrative Neuroscience SAU	Office of the Provost
COLLEGE	Special Academic Unit
DEPARTMENT	Neuroscience
MAJOR	Cell and Molecular Neuroscience
UNDERGRADUATE CONCENTRATION/ GRADUATE SPECIALIZATION	
OPTION	
MINOR	
INTERDISCIPLINARY STUDIES PROGRAM	
DEGREE	B.S. in Neuroscience

EFFECTIVE DATE (TERM AND YEAR) REQUESTED Fall, 2014

## SECTION II-JUSTIFICATION FOR REQUEST

CSU has a strong research base and national reputation in neuroscience through our graduate MCIN program. We already attract the attention of a number of students who might want to major in this important discipline. It is anticipated that the proposed program will draw students who would not otherwise come to CSU. There are only a few public comprehensive research universities nationwide that offer undergraduate neuroscience majors, and none in states nearby Colorado. See Phase II document for more details.

## SECTION III (SEE PG. 2)

## SECTION IV-SIGNATURES OF AFFECTED DEPARTMENTS (SEE PG. 3)

### CHANNELS FOR APPROVAL

DATE  
 Department Head/Chairperson: [Signature] 7-11-13  
 Chairperson, College Curriculum Committee: [Signature] 7-25-13  
 Dean of College: [Signature] 7-25-13

\*Signature indicates approval and a commitment of resources

CURRICULUM & CATALOG USE	Approval Date
Comm. On Scholarship, Research, and Graduate Education (CoSRGE)	
University Curriculum Committee	
Faculty Council	
Approved Effective Date	

Call 1-1451, Curriculum and Catalog Administration, for information.



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UPDATED

SEP 03 2013

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## SECTION III-LISTING OF CURRICULUM REQUIREMENTS

A. LIST COMPLETE CURRENT REQUIREMENTS  
(Please contact Curriculum and Catalog to request a current program of study.)

B. EITHER LIST COMPLETE NEW PROGRAM OR ONLY PROPOSED CHANGES (CHANGES, DROPS, AND ADDS). (For examples, see Appendices in the *Curricular Policies and Procedures Handbook*.) INCLUDE: Course prefix, number, title, and number of credits. Note superscript "P" after course number if course has a prerequisite.

FIRST YEAR	CREDITS	FIRST YEAR	CREDITS
		<i>Neuroscience</i>	
		*NB 192 Introductory Seminar	1*
		*PSY 100 General Psychology (AUCC 3C)	3*
		*CHEM 111 <sup>P</sup> General Chemistry I (AUCC 3A)	4*
		*CHEM 112 <sup>P</sup> General Chemistry Laboratory I (AUCC 3A)	1*
		*CHEM 113 <sup>P</sup> General Chemistry II	3*
		*CHEM 114 <sup>P</sup> General Chemistry Laboratory II	1*
		*LIFE 102 <sup>P</sup> (AUCC 3A) Attributes of Living Systems	4*
		*LIFE 201B <sup>P</sup> Intro. Genetics-Molecular/Immunological/Developmental	3*
		*LIFE 203 <sup>P</sup> Introductory Genetics Laboratory	2*
		*MATH 155 <sup>P</sup> Calculus for Biological Scientists I (AUCC 1B)	4*
		*CO 150 <sup>P</sup> College Composition (AUCC 1A)	3*
		Arts/Humanities <sup>1</sup> (AUCC 3B)	3*
		<b>TOTAL</b>	<b>32</b>
SECOND YEAR	CREDITS	SECOND YEAR	CREDITS
		CO 300 <sup>P</sup> Writing Arguments <sup>2</sup> (AUCC 2B)	3
		OR	
		CO 301B <sup>P</sup> Writing in the Disciplines-Science <sup>3</sup> (AUCC 2B)	3
		LIFE 210 <sup>P</sup> Introductory Eukaryotic Cell Biology	3
		LIFE 212 <sup>P</sup> Introductory Cell Biology Laboratory	2
		MATH 255 <sup>P</sup> Calculus for Biological Scientists II	4
		CHEM 341 <sup>P</sup> Modern Organic Chemistry I	3
		CHEM 343 <sup>P</sup> Modern Organic Chemistry II	3
		CHEM 344 <sup>P</sup> Modern Organic Chemistry Laboratory	2
		PSY 252 <sup>P</sup> Mind, Brain, and Behavior	3
		PH 121 <sup>P</sup> General Physics I	5
		OR	
		PH 141 <sup>P</sup> Physics for Scientists and Engineers I	5
		Arts/Humanities <sup>1</sup> (AUCC 3B)	3
		<b>TOTAL</b>	<b>31</b>
THIRD YEAR	CREDITS	THIRD YEAR	CREDITS
		PH 122 <sup>P</sup> General Physics II	5
		OR	
		PH 142 <sup>P</sup> Physics for Scientists and Engineers II	5
		STAT 301 <sup>P</sup> Introduction to Statistical Methods	3
		OR	
		STAT 307 <sup>P</sup> Introduction to Biostatistics	3
		BMS 300 <sup>P</sup> Principles of Human Physiology	4
		BMS 345 <sup>P</sup> Functional Neuroanatomy	4
		BC 401 <sup>P</sup> General Biochemistry I (AUCC 4A) <sup>4</sup>	3
		BC 403 <sup>P</sup> General Biochemistry II (AUCC 4B)	3
		BC 404 <sup>P</sup> General Biochemistry Laboratory	2
		Historical Perspectives <sup>1</sup> (AUCC 3D)	3
		Global and Cultural Awareness <sup>1</sup> (AUCC 3E)	3
		<b>TOTAL</b>	<b>31</b>
FOURTH YEAR	CREDITS	FOURTH YEAR	CREDITS
		MIP 300 <sup>P</sup> General Microbiology	3
		MIP 342 <sup>P</sup> Immunology	4
		BC 465 <sup>P</sup> Molecular Regulation of Cell Function	3
		BMS 325 <sup>P</sup> Cellular Neurobiology	3
		NB 399 Thesis Preparation	1
		NB 493 Senior Seminar (AUCC 4C)	1
		NB 499 Thesis (AUCC 4A, 4C)	3
		Electives	9
		<b>TOTAL</b>	<b>26</b>
		<b>PROGRAM TOTAL = 120</b>	<b>26</b>

Move  
To Third  
Year

\* This course has at least one prerequisite. Check the Courses of Instruction section of the catalog (<http://catalog.colostate.edu>) to see the course requirements.

<sup>1</sup> Select from list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come

from intermediate (L\* 200 and L\* 201) foreign language courses.

<sup>2</sup> Select from list of courses in category 3D in the AUCC.

<sup>3</sup> First-time students entering a college or university on or after July 1, 2008, must take an advanced writing course to fulfill the AUCC category 2B requirement.

<sup>4</sup> Select from list of courses in category 3E in the AUCC.

NOTE: Departmental Signatures were collected on different days and on different forms starting in fall 2012. The attached set has one original signature from each chair on one of the 4 forms provided.

**SECTION IV - SIGNATURES OF AFFECTED DEPARTMENTS**  
 (Required before consideration by University Curriculum Committee)

Affected departments include any department outside the home department, whose course is used in the program. Affected departments might also include other departments offering a program with similar or overlapping content.

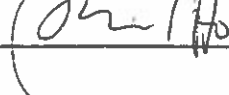
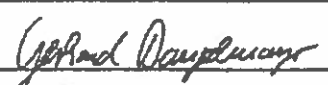

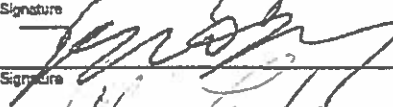

This proposal for a curricular change or addition of a program of study has been reviewed and agreed to by the following departments affected by the changes. The agreements are conditional upon the availability of the financial resources requested in the Phase II plan.

Signature	<i>[Signature]</i>	Biochemistry and Molecular Biology	9/18/2012
Signature		Chemistry	
Signature		Mathematics	9/18/12
Signature	<i>[Signature]</i>	Physics	13 MAY 2013
Signature	<i>[Signature]</i>	Psychology	8/31/12
Signature	<i>[Signature]</i>	Statistics	8/27/12
Signature	<i>[Signature]</i>	LIFE CORE	9/19/2012
Signature	<i>[Signature]</i>	Stomachal Sciences	5/13/13
Signature		Microbiology, Immunology and Pathology	
Signature			
Signature			
Signature			

**SECTION IV - SIGNATURES OF AFFECTED DEPARTMENTS**  
(Required before consideration by University Curriculum Committee)

Affected departments include any department outside the home department, whose course is used in the program. Affected departments might also include other departments offering a program with similar or overlapping content.



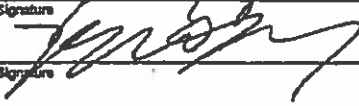
This proposal for a curricular change or addition of a program of study has been reviewed and agreed to by the following departments affected by the changes. The agreements are conditional upon the availability of the financial resources requested in the Phase II plan.

Signature 	Biochemistry and Molecular Biology	9/18/2012
Signature _____	Department _____	Date _____
Signature _____	Chemistry	
Signature _____	Department _____	Date _____
Signature 	Mathematics	9/18/12
Signature _____	Department _____	Date _____
Signature _____	Physics	
Signature 	Department _____	Date _____
Signature _____	Psychology	8/31/12
Signature 	Department _____	Date _____
Signature _____	Statistics	8/27/12
Signature 	Department _____	Date _____
Signature _____	LIFE CORE	9/19/2012
Signature _____	Department _____	Date _____
Signature _____	Biomedical Sciences	
Signature _____	Department _____	Date _____
Signature _____	Microbiology, Immunology and Pathology	
Signature _____	Department _____	Date _____
Signature _____	Department _____	Date _____
Signature _____	Department _____	Date _____
Signature _____	Department _____	Date _____

**SECTION IV - SIGNATURES OF AFFECTED DEPARTMENTS**  
(Required before consideration by University Curriculum Committee)

Affected departments include any department outside the home department, whose course is used in the program. Affected departments might also include other departments offering a program with similar or overlapping content.

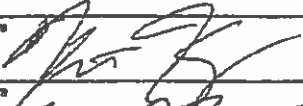

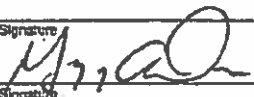
This proposal for a curricular change or addition of a program of study has been reviewed and agreed to by the following departments affected by the changes. The agreements are conditional upon the availability of the financial resources requested in the Phase II plan.

<b>Biochemistry and Molecular Biology</b>		
Signature	Department	Date
<b>Chemistry</b>		
Signature	Department	Date
	Mathematics Chemistry	9/20/12
Signature	Department	Date
<b>Physics</b>		
Signature	Department	Date
	Psychology	8/31/12
Signature	Department	Date
	Statistics	8/27/12
Signature	Department	Date
<b>LIFE CORE</b>		
Signature	Department	Date
<b>Biomedical Sciences</b>		
Signature	Department	Date
<b>Microbiology, Immunology and Pathology</b>		
Signature	Department	Date
Signature	Department	Date
Signature	Department	Date

**SECTION IV - SIGNATURES OF AFFECTED DEPARTMENTS**  
(Required before consideration by University Curriculum Committee)

Affected departments include any department outside the home department, whose course is used in the program. Affected departments might also include other departments offering a program with similar or overlapping content.

This proposal for a curricular change or addition of a program of study has been reviewed and agreed to by the following departments affected by the changes. The agreements are conditional upon the availability of the financial resources requested in the Phase II plan.

<b>Biochemistry and Molecular Biology</b>		
Signature _____	Department _____	Date _____
	Chemistry	
Signature _____	Department _____	Date _____
	Mathematics	
Signature _____	Department _____	Date _____
	Physics	
Signature 	Department _____	Date <u>8/31/12</u>
	Psychology	
Signature 	Department _____	Date _____
	Statistics	<u>8/27/12</u>
Signature _____	Department _____	Date _____
	LIFE CORE	
Signature _____	Department _____	Date _____
	Biomedical Sciences	
Signature 	Department _____	Date _____
	Microbiology, Immunology and Pathology	<u>9-17-12</u>
Signature _____	Department _____	Date _____
Signature _____	Department _____	Date _____
Signature _____	Department _____	Date _____

Draft of Proposed Catalog Copy- from J. Bamburg, June 7, 2013

### Major in Neuroscience

The Neuroscience Special Academic Unit is an interdisciplinary undergraduate degree-granting program with faculty in five different colleges and ten departments. Two different concentrations are offered as programs of study at the undergraduate level: Behavioral and Cognitive Neuroscience and Cell and Molecular Neuroscience. Both concentrations have a strong foundation in mathematics, physics, chemistry and biological sciences that utilize a common core for the first two years, differing in only a single course for each concentration, thus making it easy to switch between concentrations if a student's interest changes during the first two years. Both concentrations require completion of an undergraduate thesis, providing significant opportunities for experiential learning in research laboratories in which they work closely with faculty, and which sometimes lead to authorship of original publications. Electives allow students in one concentration to acquire breadth and depth in the other area, if desired.

The Behavioral and Cognitive Neuroscience concentration integrates an understanding of neuroanatomy with the mechanisms of sensation/perception and learning/memory, generally applied to human behavior. Its focus is more at the functional level of neuronal systems and networks. It differs from classical psychology in providing a more in depth cellular and molecular basis for understanding behavior and neurological disorders that influence behavior. Graduates of this concentration are well prepared for many graduate and professional degree programs in health professions, as well as for careers within hospitals, non-profit disease oriented foundations, and private sector organizations in either research-related or human resource service-related positions.

The Cell and Molecular Neuroscience concentration integrates neuroanatomy with the cellular and molecular basis of nervous system function. Its focus is more at the molecular level in understanding specific cellular based processes in neurons and glia. It differs from degree programs in biochemistry or biomedical sciences through its strong focus on the nervous system. Required courses in microbiology, immunology, biochemistry and advanced cell biology provide an excellent breadth in background for those students interested in pursuing careers in medicine or biomedical research through graduate/professional schools. However, graduates of this concentration also should be well qualified for technical positions in academic, government or private sector laboratories doing cell and molecular research, whether or not it is applied to the nervous system.

### Learning Outcomes

Students will obtain:

- A command of the basic concepts of chemistry, physics, biology, biochemistry, molecular biology, and cellular biology as well as a more in depth understanding of the structure and function of the nervous system
- An understanding of how the brain works, from molecules to the mind, and how its function becomes disrupted for some diseases and brain injuries.

Draft of Proposed Catalog Copy- from J. Bamburg, June 7, 2013

- The ability to critically analyze, and present the methods, results, and conclusions of scientific papers in the current neuroscience literature, and orally present technical material in a clear and comprehensible form
- Experience in use of a variety of laboratory techniques, critically interpret experimental results, and design new experiments
- The ability to perform original research or to critically analyze published work to advance an understanding of some area of neuroscience by preparing and defending an undergraduate thesis

### **Potential Occupations**

Possible career opportunities for students with a B.S. in neuroscience include, but are not limited to: research technician, medical or clinical lab technologist, production/quality assurance lab technician, pharmaceutical research worker or salesperson, human resource specialist, neurotoxicology technician, teacher, writer, research analyst. Many neuroscience majors go to professional schools in medicine, veterinary medicine, or health sciences, or into graduate programs encompassing virtually all areas of biomedical sciences and psychology.



**Molecular, Cellular, and Integrative Neuroscience Special Academic Unit**  
**Major in Neuroscience**  
**Cell and Molecular Neuroscience Concentration**

Effective Fall 2014

(The entire program is shown.)

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
<b>FRESHMAN</b>			
CHEM 111 <sup>P</sup>	General Chemistry I	4	3A
CHEM 112 <sup>P</sup>	General Chemistry Laboratory I	1	3A
CHEM 113 <sup>P</sup>	General Chemistry II	3	
CHEM 114 <sup>P</sup>	General Chemistry Laboratory II	1	
CO 150 <sup>P</sup>	College Composition	3	1A
LIFE 102 <sup>P</sup>	Attributes of Living Systems	4	3A
LIFE 201B <sup>P</sup>	Introductory Genetics	3	3A
LIFE 203 <sup>P</sup>	Introductory Genetics Laboratory	2	
MATH 155 <sup>P</sup>	Calculus for Biological Scientists I	4	1B
NB 192	Introductory Neuroscience Seminar	1	
PSY 100	General Psychology	3	3C
	Arts and Humanities <sup>1</sup>	3	3B
	<b>TOTAL</b>	<b>32</b>	
<b>SOPHOMORE</b>			
CHEM 341 <sup>P</sup>	Modern Organic Chemistry I	3	
CHEM 343 <sup>P</sup>	Modern Organic Chemistry II	3	
CHEM 344 <sup>P</sup>	Modern Organic Chemistry Laboratory	2	
CO 300 <sup>P</sup>	Writing Arguments	3	2
	<b>OR</b>		
CO 301B <sup>P</sup>	Writing in the Disciplines	3	2
LIFE 210 <sup>P</sup>	Introductory Eukaryotic Cell Biology	3	
LIFE 212 <sup>P</sup>	Introductory Cell Biology Laboratory	2	
MATH 255 <sup>P</sup>	Calculus for Biological Scientists II	4	1B
PH 121 <sup>P</sup>	General Physics I	5	3A
	<b>OR</b>		
PH 141	Physics for Scientists and Engineers I	5	3A
PSY 252 <sup>P</sup>	Mind, Brain, and Behavior	3	
	Arts and Humanities <sup>1</sup>	3	3B
	<b>TOTAL</b>	<b>31</b>	
<b>JUNIOR</b>			
BC 401 <sup>P</sup>	Comprehensive Biochemistry I	3	4A
BC 403 <sup>P</sup>	Comprehensive Biochemistry II	3	4B
BC 404 <sup>P</sup>	Comprehensive Biochemistry Laboratory	2	
BMS 300 <sup>P</sup>	Principles of Human Physiology	4	
BMS 345 <sup>P</sup>	Functional Neuroanatomy	4	
NB 399	Thesis Preparation	1	
PH 122 <sup>P</sup>	General Physics II	5	3A
	<b>OR</b>		
PH 142 <sup>P</sup>	Physics for Scientists and Engineers II	5	3A
STAT 301 <sup>P</sup>	Introduction to Statistical Methods	3	
	<b>OR</b>		
STAT 307 <sup>P</sup>	Introduction to Biostatistics	3	
	Global and Cultural Awareness <sup>2</sup>	3	3E
	Historical Perspectives <sup>3</sup>	3	3D
	<b>TOTAL</b>	<b>31</b>	
<b>SENIOR</b>			

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UPDATED  
SEP 03 2010

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**Major in Neuroscience**  
**Cell and Molecular Neuroscience Concentration**

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<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
BC 465 <sup>p</sup>	<u>Molecular Regulation of Cell Function</u>	3	
BMS 325	<u>Cellular Neurobiology</u>	3	
MIP 300 <sup>p</sup>	<u>General Microbiology</u>	3	
MIP 342 <sup>p</sup>	<u>Immunology</u>	4	
NB 493	<u>Senior Seminar</u>	1	4C
NB 499	<u>Senior Thesis</u>	3	
	<u>Electives<sup>4</sup></u>	9	
	<b>TOTAL</b>	<u>26</u>	

**PROGRAM TOTAL = 120 credits**

<sup>p</sup> This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

<sup>1</sup> Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for arts and humanities may come from intermediate (L\* 200 and L\* 201) foreign language courses.

<sup>2</sup> Select from the list of courses in category 3E in the AUCC.

<sup>3</sup> Select from the list of courses in category 3D in the AUCC.

<sup>4</sup> Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper division.

October 11, 2013

TO: Tim Gallagher, Chair  
Executive Committee and Faculty Council

FROM: Carole Makela, Chair  
University Curriculum Committee

SUBJECT: Request for new major in Statistics, B.S.

The University Curriculum Committee moves Faculty Council adopt the following:

**A new major in Statistics (B.S.) be established effective Fall Semester 2014.**

The proposed a major in Statistics, pending approval of the Board of Governors and CCHE, would be effective Fall Semester 2014.

The proposal was reviewed and approved by University Curriculum Committee (UCC) on October 11, 2013.

Rationale:

From the Phase II document, ...until 2000, CSU offered the Major in Statistics as an undergraduate degree. It was discontinued in Fall 2000 due to action by the Colorado Commission of Higher Education (CCHE). When the major was discontinued, it was immediately recreated as the Statistics Concentration within the Major in Mathematics....

By re-establishing the Major in Statistics, and eliminating the concentration in statistics in the mathematics major, the visibility of the degree and its identity as a separate degree from Mathematics will be greatly enhanced. Combined with the increasing demand for statisticians currently, this could lead to significant growth in the number of students pursuing a statistics major over the next few years. An undergraduate degree in the Department of Statistics will mean the degree content, curriculum design, and student mentoring are determined by faculty immersed specifically in statistics. Statistics faculty will be in a better position to adapt the degree in the future to proactively address dynamic challenges in society that require the academic study of statistics to resolve (e.g., the current emphasis on "Big Data").

The Major in Statistics enables students to mix interests in mathematical and computer sciences with a variety of real applications. While statistics is closely related to mathematics as a discipline, the skills needed to be a successful statistician are substantially different from those of a mathematician. Most universities with departments of statistics separate the two curricula and corresponding degrees. The current request is for Colorado State University to do the same.

Enclosures

xc Carole Makela

SEP 05 2013 90

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## NEW/MAJOR/MINOR PROGRAMS OF STUDY-CURRICULAR REQUESTS

CONTACT PLEASE PRINT: Jennifer Hoeting EMAIL [jennifer.hoeting@colostate.edu](mailto:jennifer.hoeting@colostate.edu) PHONE 491-2897  
(REQUIRED)CHECK THE APPROPRIATE LINE ON THE FAR LEFT. See Curricular Policies and Procedures Handbook, available at <http://www.colostate.edu/orgs/ucc> for instructions.

## ADDS

- ☐ ADD a new department and/or college. (Complete Section I-Column B and Sections II and V.)
- ☒ ADD a new degree or major or concentration or option or minor or interdisciplinary studies program. (Complete Section I-Column B, Section II, Section III-Column B, Section IV as needed, and Section V.)

## MAJOR CHANGES

- ☐ CHANGE the name of an existing department and/or college. (Complete Section I-Column A, only changed item(s) in Section I-Column B, and Section II.)
- ☐ CHANGE the name of a degree or major or concentration or option or minor or interdisciplinary studies program. (Complete Section I-Column A, only changed item(s) in Section I-Column B, and Section II.)
- ☐ CHANGE the curriculum requirements of an approved major or concentration or option or minor or interdisciplinary studies program involving a sum total of 7 or more credits. (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B, Section IV as needed.)
- ☐ CHANGE AUCC Category 4 requirements of an approved major or concentration. (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B.)
- ☐ DROP a degree or major or concentration or option or minor or interdisciplinary studies program and requirements. (Complete Section I-Column A and Section II.)

## MINOR CHANGES

- ☐ CHANGE the curriculum requirements of an approved major or concentration or option or minor or interdisciplinary studies program involving a sum total of less than 7 credits. (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B, Section IV as needed.)
- ☐ CHANGE courses and/or group requirements from freshman/sophomore year to junior/senior year or vice versa in an approved major or concentration or option or minor or interdisciplinary studies program. (Complete Section I-Column A, Section II, Section III-Column A, and only changed item(s) in Section III-Column B.)

## SECTION I

A. PRESENT NAME / EXISTING ONLY

B. REQUESTED NAME / NEW OR CHANGES ONLY

Natural Sciences	COLLEGE
Statistics	DEPARTMENT
	MAJOR
	UNDERGRADUATE CONCENTRATION/ GRADUATE SPECIALIZATION
	OPTION
	MINOR
	INTERDISCIPLINARY STUDIES PROGRAM
	DEGREE
	B.S.

EFFECTIVE DATE (TERM AND YEAR) REQUESTED Fall 2014

## SECTION II-JUSTIFICATION FOR REQUEST

Statistics education is in demand in many fields including administration, banking, computing, ecology, insurance, medical and pharmaceutical research.

An undergraduate statistics major leads to secure, well paid employment, so there is an increasing demand for it. Such a major will draw more well prepared students to CSU, both domestic and international. The existing statistics concentration already attracts a significant proportion of the students from China who participate in the China Strategic Partnership (CSP) program.

## CHANNELS FOR APPROVAL

DATE

Department Head/Chairperson\* [Signature] 9/4/13

Chairperson, College Curriculum Committee [Signature] 9/4/13

Dean of College\* [Signature] 9/4/13

University Curriculum Committee Representative [Signature] 9-5-13

Chair, CoSRGE† [Signature]

\*Signature indicates approval and a commitment of resources.

†Graduate programs only.

Call 1-1451, Curriculum and Catalog Administration, for information.

## CURRICULUM &amp; CATALOG USE ONLY

Approval Date

Comm. On Strategic and Financial Planning (CoSFP)

Council of Deans

University Curriculum Committee

Faculty Council

Board of Governors

CCHE

Approved Effective Date

## SECTION III-LISTING OF CURRICULUM REQUIREMENTS

A. For EXISTING PROGRAMS ONLY, contact Curriculum and Catalog to request a current program of study, which will be pasted below in this column for you.  
Curriculum and Catalog: 1-1451 or 1-1578.

B. For NEW PROGRAMS, put the ENTIRE NEW PROGRAM below in this column.

For changes to EXISTING PROGRAMS, LIST ONLY PROPOSED CHANGES (CHANGES, DROPS, AND ADDS). (For examples, see Appendices in the *Curricular Policies and Procedures Handbook*.)

INCLUDE: Course subject code, number, title, number of credits, and AUCC designation (if appropriate). Note superscript "P" after course number if course has a prerequisite.

College of Natural Sciences  
Department of Statistics  
Major in Statistics

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

Course	Title	Cr	AUCC
<b>FRESHMAN</b>			
CO 150 <sup>P</sup>	College Composition	3	1A
MATH 160 <sup>P</sup>	Calculus for Physical Scientists I	4	1B
MATH 161 <sup>P</sup>	Calculus for Physical Scientists II	4	1B
MATH 192	First Year Seminar in Mathematical Sciences	1	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Biological and Physical Sciences <sup>1</sup>	7	3A
	Global and Cultural Awareness <sup>2</sup>	3	3E
	Historical Perspectives <sup>3</sup>	3	3D
	Electives <sup>4</sup>	3	
	<b>TOTAL</b>	<b>29</b>	
<b>SOPHOMORE</b>			
JTC 300 <sup>P</sup>	Professional and Technical Communication	3	2
MATH 261 <sup>P</sup>	Calculus for Physical Scientists III	4	
MATH 369 <sup>P</sup>	Linear Algebra	3	
	Select one course from the following:		
STAT 301 <sup>P</sup>	Introduction to Statistical Methods	3	
STAT 307 <sup>P</sup>	Introduction to Biostatistics	3	
ERHS 307 <sup>P</sup>	Introduction to Biostatistics	3	
STAT 315 <sup>P</sup>	Statistics for Engineers and Scientists	3	
	Arts and Humanities <sup>5</sup>	6	3B
	Introductory Programming <sup>6</sup>	4	
	<b>TOTAL</b>	<b>29</b>	
<b>JUNIOR</b>			
MATH 317 <sup>P</sup>	Advanced Calculus of One Variable	4	
	Select one course from the following:		
STAT 305 <sup>P</sup>	Sampling Techniques	3	
STAT 321 <sup>P</sup>	Elementary Probabilistic-Stochastic Modeling	3	
STAT 460 <sup>P</sup>	Applied Multivariate Analysis	3	
STAT 340 <sup>P</sup>	Multiple Regression Analysis	3	
STAT 350 <sup>P</sup>	Design of Experiments	3	
	Social and Behavioral Sciences <sup>7</sup>	3	3C
	Upper Division CS/MATH/STAT	6	
	Electives <sup>8</sup>	9	
	<b>TOTAL</b>	<b>31</b>	
<b>SENIOR</b>			
STAT 372 <sup>P</sup>	Data Analysis Management Tools	3	
STAT 420 <sup>P</sup>	Probability and Mathematical Statistics I	3	
STAT 430 <sup>P</sup>	Probability and Mathematical Statistics II	3	4A
STAT 472 <sup>P</sup>	Statistical Consulting	3	4A, 4B, 4C
	Upper division CS/MATH/STAT elective <sup>9</sup>	3	
	Electives <sup>10</sup>	16	
	<b>TOTAL</b>	<b>31</b>	

Footnote 6 here

Electives 4

## PROGRAM TOTAL = 120 credits

\* This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

\* Select from the list of courses in category 3E in the All-University Core Curriculum (AUCC).

\* Select from the list of courses in category 3D in the AUCC.

\* Select enough elective credits to bring the program total to a minimum of 120 credits with a minimum of 42 upper-division credits.

\* Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.

\* Students must take either CS-160 (4 credits) or CS-155 and CS-156 plus two of the following courses: CS-157, MATH-151, MATH-152, and/or MATH-158/CS-158.

5 \* Select two courses from the list in category 3B in the AUCC. Only 3 of the 6 credits required for arts and humanities may come from Intermediate (L\* 200 and L\* 201) foreign language courses..

6 \* Select from the list of course in category 3C in the AUCC.

7 \* Upper-division computer science, mathematics, or statistics courses (excluding courses ending in -80 to -99).

Move To  
Program  
Jr. Yr.

**SECTION IV – SIGNATURES OF AFFECTED DEPARTMENTS**  
 (Required before consideration by University Curriculum Committee)

Affected departments include any department outside the home department, whose course is used in the program. Affected departments might also include other departments offering a program with similar or overlapping content.

This proposal for a curricular change or addition of a program of study has been reviewed and agreed to by the following departments affected by the changes.

<i>Paul Hering</i>	Statistics	9/4/13
Signature	Department	Date
<i>Paul Hering</i>	Mathematics	9/4/13
Signature	Department	Date
Signature	Department	Date
Signature	Department	Date

**SECTION V – COPY FOR THE GENERAL CATALOG**

(Required for all new colleges, departments, and programs. Contact Curriculum and Catalog for examples and assistance. Copy and paste here or attach separate page(s) )

**College of Natural Sciences**  
**Department of Statistics**  
**Major in Statistics**

Effective Fall 2014

A minimum grade of C is required in all mathematics, statistics, and computer science courses required for graduation.

<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
<b>FRESHMAN</b>			
CO 150 <sup>P</sup>	College Composition	3	1A
MATH 160 <sup>P</sup>	Calculus for Physical Scientists I	4	1B
MATH 161 <sup>P</sup>	Calculus for Physical Scientists II	4	1B
MATH 192	First Year Seminar in Mathematical Sciences	1	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Biological and Physical Sciences <sup>1</sup>	7	3A
	Global and Cultural Awareness <sup>2</sup>	3	3E
	Historical Perspectives <sup>3</sup>	3	3D
	Electives	3	
	<b>TOTAL</b>	<b>29</b>	
<b>SOPHOMORE</b>			
<i>Select one of the following two selections for 4 credits:</i>			
CS 160 <sup>P</sup>	Foundations in Programming	4	
<b>OR</b>			
CS 155 <sup>P</sup>	Introduction to Unix	1	
CS 156 <sup>P</sup>	Introduction to C Programming I	1	
<i>And select two courses from the following:</i>			
CS 157	Introduction to C Programming II	1	
CS 158/	Mathematical Algorithms in C	1	
MATH 158			
MATH 151	Mathematical Algorithms in Matlab I	1	
MATH 152	Mathematical Algorithms in Maple	1	
JTC 300 <sup>P</sup>	Professional and Technical Communication	3	2
MATH 261 <sup>P</sup>	Calculus for Physical Scientists III	4	
MATH 369 <sup>P</sup>	Linear Algebra	3	
<i>Select one course from the following:</i>			
STAT 301 <sup>P</sup>	Introduction to Statistical Methods	3	
STAT 307/	Introduction to Biostatistics	3	
ERHS 307 <sup>P</sup>			
STAT 315 <sup>P</sup>	Statistics for Engineers and Scientists	3	
	Arts and Humanities <sup>4</sup>	6	3B
	Electives	6	
	<b>TOTAL</b>	<b>29</b>	
<b>JUNIOR</b>			
MATH 317 <sup>P</sup>	Advanced Calculus of One Variable	4	
<i>Select one course from the following:</i>			
STAT 305 <sup>P</sup>	Sampling Techniques	3	
STAT 321 <sup>P</sup>	Elementary Probabilistic-Stochastic Modeling	3	
STAT 460 <sup>P</sup>	Applied Multivariate Analysis	3	
STAT 340 <sup>P</sup>	Multiple Regression Analysis	3	
STAT 350 <sup>P</sup>	Design of Experiments	3	
	Social and Behavioral Sciences <sup>5</sup>	3	3C
	Upper Division CS/MATH/STAT electives <sup>6</sup>	6	
	Electives	2	



**Major in Mathematics  
Statistics Concentration**

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<u>Course</u>	<u>Title</u>	<u>Cr</u>	<u>AUCC</u>
	<u>TOTAL</u>	<u>31</u>	
<b>SENIOR</b>			
STAT 372 <sup>p</sup>	Data Analysis Management Tools	3	
STAT 420 <sup>p</sup>	Probability and Mathematical Statistics I	3	
STAT 430 <sup>p</sup>	Probability and Mathematical Statistics II	3	4A
STAT 472 <sup>p</sup>	Statistical Consulting	3	4A,4B,4C
	Upper division CS/MATH/STAT elective <sup>6</sup>	3	
	Electives <sup>7</sup>	16	
	<u>TOTAL</u>	<u>31</u>	
<b>PROGRAM TOTAL = 120 credits</b>			

<sup>p</sup> This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.

<sup>1</sup> Select from the list of courses in category 3A in the All-University Core Curriculum (AUCC). One course must have a laboratory component.

<sup>2</sup> Select from the list of courses in category 3E in the AUCC.

<sup>3</sup> Select from the list of courses in category 3D in the AUCC.

<sup>4</sup> Select two courses from the list in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L\* 200 and L\* 201) foreign language courses..

<sup>5</sup> Select from the list of course in category 3C in the AUCC.

<sup>6</sup> Upper-division computer science, mathematics, or statistics courses (excluding courses ending in -82 to -99).

<sup>7</sup> Select enough elective credits to bring the program total to a minimum of 120 credits with a minimum of 42 upper-division credits.

**PHASE 2 PROPOSAL: UNDERGRADUATE MAJOR IN STATISTICS****To: Alan Lamborn, Vice Provost for Undergraduate Affairs****From: Jean Opsomer, Professor and Chair of the Department of Statistics****Date: July 11, 2013**

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## PHASE 1 PROPOSAL

1-5. See Appendix.

## PHASE 2 PROPOSAL: UNDERGRADUATE MAJOR IN STATISTICS

### Students

#### 6. Student Body

For Undergraduate Programs:

- What is the ideal number of students in terms of total student enrollment (after program has been in place for five years)?

A total of 40 students in the major total student enrollment would be ideal, but we could have more if growth in statistics continues to be strong.

- What number do you feel would be ideal for the “entering class?”

Since the concentration is already in place the ideal entering class already exists and is 32 students in SP14. Note that this is already substantially larger than a few years ago, as discussed under question (4) in the Phase 1 Proposal.

- Present a time line explaining how you expect those numbers to grow as you build toward your first graduating class. How many students do you expect to graduate in a given year once the program is at ideal size?

Anticipated time line for first 5 years of major:

2013-14: 32 majors, graduate 4 majors

2014-15: 36 majors, graduate 5 majors

2015-16: 42 majors, graduate 7 majors

2016-17: 46 majors, graduate 8 majors

2017-18: 50 majors, graduate 10 majors

We do not currently anticipate growing beyond this size in the Major in Statistics.

- Is the proposed program intended to provide another program option to a significant number of students who are already being attracted to or attending CSU? Provide explicit detail.

There is some early evidence that statistics is an attractive area of study for many international students. With the planned growth in the Strategic Partnership programs around the world and the anticipated influx of additional international students through INTO, we conjecture that the major may have the potential for growth.

- If the program is expected to attract students from other campus departments, attach a letter from the relevant department head and dean indicating their support (or lack thereof) for the new proposal in terms of shift of student enrollment from that particular department.

Since we already advise all the students in the Statistics Concentration in the Mathematics Major and teach all of the Statistics courses, this will cause no shifts in workload from other departments. However, we have enclosed a letter of support from the Chairmen of the Departments of Mathematics and Computer Science showing their support of this proposal.

- Is it anticipated that the proposed program will draw students who would not otherwise come to the institution?

By having a well-publicized Major in Statistics, it is possible (but difficult to quantify) that we will draw more students from Colorado to CSU. In addition, as suggested above, the Statistics Major can be used as a marketing tool for international students.<sup>t</sup>

- What is the student profile in other programs that the department currently offers (e.g, mean index score; resident compared to nonresident numbers; ethnicity of student body).

The average student with a statistics concentration has a very strong background entering CSU and continues to have high grades while attending CSU, in spite of taking challenging mathematics and statistics courses. There is a high percentage of non-resident students in the statistics concentration because many students in the China Strategic Partnership program enroll in the statistics concentration.

Student profile

	High school GPA*	SAT*	ACT*	CSU GPA	% female	% non-resident
Statistics concentration students, SP13	3.89	1197	27	3.33	42%	53%
All CSU students, SP13	3.55	1135	25	2.93	51%	24%

\*These columns only include the students from the USA. CSU does not require high school GPA, SAT, or ACT for students in the China Strategic Partnership (CSP) program.

- Is there any reason to believe that the profile of the student body in the new program area would be any different than the existing profile? Please explain.

The results above should be similar for the new major. If more students who are in the CSP program become statistics majors, we expect that the CSU GPA for Statistics majors will increase.

#### 7. Admission Requirements

- Are any requirements for admission to the proposed program being recommended that are higher than CSU's minimum requirements? If so, what are the recommendations? What is your rationale for the higher standards?

No additional admission requirements are needed beyond the current requirements.

#### 8. Course of Study

- List all courses comprising the program's overall curriculum. Please provide the following information for each course: course number, title, credits, prerequisite, catalog description  
(Please **BOLD** entries for any NEW courses that are being proposed as a part of this curriculum)

At this time we are not proposing any new courses. Once the major gets established, we plan to gradually propose new courses and/or revise existing ones over the course of several years, in order to continue to modernize the curriculum.

The program's proposed program of study reflects the current concentration in statistics in the Mathematics Major. The new Statistics Major will replace the Mathematics Concentration in Statistics. We give a summary of the program below and have attached the relevant course requirements in Appendix C from the CSU General Catalog. See also the Mathematics Major with Statistics Concentration Checksheet in Appendix B.

#### All University Core Curriculum (AUCC) Requirements

##### *Basic Competencies* (6 credits)

- A. Intermediate Writing [3]: CO 150 College Composition
- B. Mathematics [3]: fulfilled with Math160 (see below)

##### *2. Advanced Writing* (3 credits) [3]: JTC 300 Prof. and Tech Comm.

##### *3. Foundations and Perspectives* (22 credits)

- A. Biological/Physical Sciences [7]  
(At least one course will have an associated lab)
- B. Arts/Humanities [6]
- C. Social/Behavioral Sciences [3]
- D. Historical Perspectives [3]
- E. Global and Cultural Awareness [3]

#### 4. *Depth and Integration*

- A. Core Competencies : Fulfilled via STAT430 and also STAT472 (see below)
- B. Integrating foundations of knowledge: Fulfilled via STAT472 (see below)
- C. Capstone: Fulfilled via STAT472 (see below)

#### Statistics major requirements

Freshman seminar:

1. MATH 192 First-Year Seminar in Mathematical Sciences [1]
2. STAT 192 First-Year Seminar in Mathematical Sciences

Take all of the following mathematics courses:

1. MATH 160 Calc for Physical Scientists I [4]
2. MATH 161 Calc for Physical Scientists II [4]
3. MATH 261 Calc for Physical Scientists III [4]
4. MATH 317 Advanced Calc of One Variable [4]
5. MATH 369 Linear Algebra [3]

Take one of introductory statistics:

- STAT 301 Intro to Statistical Methods [3]
- STAT/ERHS 307 Intro to Biostatistics [3]
- STAT 315 (309) Statistics for Eng & Sci [3]

Take one of the following statistics courses:

- STAT 305 Sampling Techniques [3]
- STAT 321 Elem. Prob/Stochastic Modeling [3]
- STAT 460 Applied Multivariate Analysis [3]

Take all of the following statistics courses:

1. STAT 340 (304) Multiple Regression Analysis [3]
2. STAT 350 (302) Design of Experiments [3]
3. STAT 420 Probability/Math Stat I [3]
4. STAT 430 Probability/Math Stat II [3]
5. STAT 372 (310) Data Analysis Tools [3]
6. STAT 472 Statistical Consulting [3]

Learn a programming language via option 1 or 2:

1. CS 160 Foundations in Programming [4] or
2. Four one-credit programming classes:
  - Take both CS155 and CS156:
    - CS 155 Introduction to Unix [1]
    - CS 156 Introduction to C Programming I
  - Choose 2 of the following classes:
    - CS 157 Introduction to C Programming II [1]
    - MATH 151 Math. Algorithms in Matlab I [1]

- MATH 152 Math. Algorithms in Maple [1]
- MATH 158 Math Algorithms in C [1]

Subject-matter electives: 9 credits of Upper division computer science, mathematics, or statistics courses (excluding courses ending in -80 to -99 and MATH 315)

Unrestricted electives: 34 credits

- Provide a discussion of any nontraditional learning modes to be utilized in the new courses, including, but not limited to: (1) the role of technology, and (2) the use of career development activities such as practica or internships.

We encourage our students to seek internships and research opportunities. Each semester we have a number of undergraduate majors enrolled in independent research credit (ST498). Students do research with department faculty or local government researchers.

#### 9. Curriculum - courses and total structure

Include total curriculum design as discussed at University Curriculum Committee. Use the appropriate UCC forms, found on the web. Once the Phase I report has been approved, you may choose to submit this packet to University Curriculum Committee to get preliminary feedback as to whether they have any questions or concerns about the proposed curriculum.

See checksheet for Mathematics Major with Concentration in Statistics in the appendix.

#### 10. Assessment of Student Learning/Outcomes Evaluation

*(Please ask CSU Director of Assessment to serve as a resource for these questions)*

- What specific learning outcomes will be achieved by students who complete this proposed program of study?
- What methods will be used to assess student learning? How will student learning assessment be embedded in the curriculum?
- What specific methods or approaches will be used to assess graduate (completer) outcomes?
- Is a licensure examination associated with this field of study?  
No.
- How will the institution determine the extent to which the academic program meets the objectives (section 2) previously outlined? (Identify specific post-approval monitoring procedures and outcome indicators to be used.)
- How will the collected information be used to improve teaching, advising, and co-curriculum activities to enhance student learning?

The main learning outcome of the Major in Statistics is the mastery of statistical thinking. More specifically, this includes the ability to conceptualize analytical questions in terms of a model, to identify and describe sources of randomness, and to be able to perform, interpret and communicate statistical inference. Other learning outcomes that support this main outcome are knowledge of the core set of statistical methods, knowledge of at least one



statistical software platform, and the ability to apply statistical methods in data analysis using software.

Assessment of student learning will be performed through comprehensive exams in all the core courses in the program of study. In addition, all students in the major will be taking STAT472, the capstone consulting course in which they work as statisticians as part of a team to solve a real-world statistical analysis problem. Doing well in this course requires them to integrate knowledge gained through the other courses in the curriculum, and provides a way to assess whether they have mastered statistical thinking and gained knowledge in statistical methods.

Assessment of student learning after graduation will be done by tracking which positions students are taking, and whether they are pursuing higher education or starting a professional career. We would also like to perform surveys of students 5 and 10 years after graduation, but current CSU Alumni Association records make this impractical. If these records improve in the future to the extent that sufficient alumni with the Major in Statistics can be located, we would start periodically conducting such a survey.

Information on placement, fraction going to graduate school and later career tracks will allow us to identify strengths and potential weaknesses of our current course offerings, and will be used to continue adjusting the content of the courses covering the core statistical methods as well as the capstone consulting course.

## Faculty

### 11. "Snapshot" of Faculty Resources

- Identify current program faculty, briefly describing each faculty member's expertise/specialization. Separate regular core faculty from other departments' faculty and adjuncts.

#### Regular Core Faculty

Name	Position	Degree	Area of specialization
Breidt, F. Jay	Tenured	PhD	Environmental and ecological statistics, time series, surveys
Chapman, Phil	Tenured	PhD	Applied linear modeling, statistical consulting
Cooley, Dan	Tenured	PhD	Extreme values, spatial statistics, environmental applications
Estep, Don	Tenured	PhD	Computational differential equations, dynamical systems
Givens, Geof	Tenured	PhD	Statistical conservation biology, statistical computing
Hoeting, Jennifer	Tenured	PhD	Bayesian statistics, model selection and uncertainty
Homrighausen, Darren	Tenure-Track	PhD	Astrostatistics, inverse problems, asymptotic theory
Kokoszka, Piotr	Tenured	PhD	Time series analysis, functional data analysis, asymptotic theory
Lee, Chihoon	Tenure-Track	PhD	Probability, stochastic analysis, queueing networks, stochastic control
Lee, Myung-Hee	Tenure-Track	PhD	Statistical theory, multivariate analysis, bioinformatics
Meyer, Mary	Tenured	PhD	Nonparametric function estimation and inference
Opsomer, Jean	Tenured	PhD	Survey Statistics, nonparametric statistics, environmental stat
Wang, Haonan	Tenured	PhD	functional data analysis and application, multivariate analysis

**Other Department Faculty**

Anderson, Jana	Special	PhD	Developments in Statistical Education (no teaching)
Dahlke, Mark	Special	PhD	Nonparametric statistics, survey statistics, education
Green, Gerwyn	Special	PhD	Mixed modeling, multiple testing, medical statistics
Hess, Ann	Special	PhD	Bioinformatics, experimental design, linear models
Zumbrunnen, Jim	Special	MS	General statistical consulting (no teaching)

- Estimate the number, rank, and background of new faculty members who would need to be added to initiate the proposed program in each of the first four years of the proposed program's operation (assuming the program develops as anticipated). What resource commitment is required and how will it be provided?

No new faculty resources needed.

- Estimate the number and type of support staff needed in each of the first four years of the program.

We are in the process of hiring a new State Classified person to handle the undergraduate administration, bringing the department back up to the level of staffing before the budget cuts. This person will work with the Undergraduate Advisor and will support the undergraduate major.

**12. Faculty Vitae**

- For a new undergraduate program, include abbreviated vitae (1-3 pages) for all tenured/tenuretrack faculty members as appendices.

See Appendix.

**Resources****13. Impact of Program Request on Curriculum and Students**

- What is the current department enrollment by degree level?

The department has a heavy teaching load for our faculty size with over 1200 students per semester enrolled in our introductory statistics courses which serve the entire university, at the undergraduate and graduate levels. In addition, we have two existing minors of statistics (Statistics and Applied Statistics), we advise the statistics concentration for the mathematics major, we have a very active distance degree masters program, and we have a top graduate program in statistics.

The enrollment in each degree program in Spring 2013 is as follows:

Degree	# students enrolled SP13
Statistics minor	16
Applied Statistics minor	26
Math major (Statistics concentration)*	32
Distance (MS and MAS)	84
Masters of Applied Statistics (on-campus)	7
Masters of Statistics	22
PhD in Statistics	23

\*These will become Statistics Majors if the Major is approved

- Are any of the department's current program areas "controlled" or "capped"?

No.

- Is the Center for Advising and Student Achievement (CASA) currently involved in advising any major for a "seeking" category that involves any of the department's degree areas? Please explain and provide relevant data.

No.

- If approved, how will launching a new degree impact the commitment already made to students in other program areas?

No anticipated impact.

- Provide a detailed plan as to how resources within the department would be re-allocated to contribute to the resource base needed for this proposed program (e.g., will the department need to "cap" another program? would additional enrollment growth funding be necessary to meet current student demand for courses?).

No changes needed.

- What are "collateral expenses" that must be taken into account in order to offer this academic program? (E.g., other than AUCC (core) courses, how will other department's teaching loads and facilities be affected by inclusion of their courses in the proposed curriculum. Provide a letter from other units indicating whether they would be able to "absorb" the projected number of students into already existing sections or whether they will need to add sections. If there is a need to add, can this be done with existing resources?

No changes needed as we are moving the math concentration back to the Statistics Department. We already do the advising for this concentration, so this will not impact the Mathematics Department.

#### 14. Library Reference Sources

*Note: this section must be reviewed by the Library Staff and certified by the Dean of the Libraries. Seek feedback from the Dean of the Library during Phase 1 so that work might begin on adequacy of the collection.*

Describe the adequacy of student and faculty access to library and department resources (including, but not limited to, printed media, electronically published materials, videotapes, motion pictures, CDROM and online databases, and sound files) that are relevant to the proposed program (e.g., is there a recommended list of materials issued by the American Library Association of some other requirements of the recommended list?).

- How much, if any, additional financial support will be required to bring access to such reference materials to an appropriate level? How is it proposed that these additional resources will be provided?

The CSU Library, with the help of the Statistics subject-matter librarian, Michelle Wilde, continues to offer state-of-the art references in Statistics. No new resources or financial support will be required with the establishment of the Statistics major. See enclosed letter of support from Dean of Libraries, Patrick Burns.

#### 15. Facilities, Equipment, and Technology

- What unique resources (in terms of buildings, laboratories, computer hardware/software, Internet or other online access, distributed-education capability, special equipment, and/or other materials) are necessary to offer a quality program in the field?

Access to a computer lab is required for some of the courses in this program (STAT372, STAT472, plus occasional sessions in other courses). It is important that this be maintained, although it does not have to be a lab dedicated exclusively to Statistics. We are working with the Department of Mathematics on a shared arrangement for the labs in Weber 205 and 206 (previously, each department controlled one of these two labs).

- What resources for facilities, beyond those now on hand, are necessary to offer this program? Be specific (e.g., include need for new space, renovated space). Be sure to address classrooms, instructional labs, office space, etc. How is it proposed that these additional resources will be provided?

None anticipated.

- What resources for equipment, and technology, beyond those now on hand, are necessary to offer this program? How is it proposed these additional resources will be provided?

None anticipated.

#### 16. Summary of Budget Needs

Summarize all new budget resources you are requesting from CSU Central Administration.

As part of this section, complete the attached financial planning form.

None anticipated.

## **Appendix**

### **A. Letters of support**

- i. Dean of the College of Natural Sciences Janice Nerger
- ii. Dean of Libraries Patrick Burns
- iii. Chairman of the Department of Mathematics Gerhard Dangelmayr
- iv. Chairman of the Department of Computer Science Darrell Whitley

### **B. Faculty Vitae**

### **C. Documents for the undergraduate major**

- i. Statistics Concentration in Mathematics Checksheet
- ii. CSU General Catalog: Statistics concentration
- iii. CSU General Catalog: Statistics undergraduate courses
- iv. CSU General Catalog: Mathematics undergraduate courses (some are required for the proposed Statistics major)

## **PHASE 1 PROPOSAL: UNDERGRADUATE MAJOR IN STATISTICS**

### **1. Brief Overview of Proposed Program**

Name of the degree: **Major in Statistics**

Type of degree: B.S.

Proposing unit(s): Statistics Department, College of Natural Sciences

Expected total number of students enrolled in program: 20/year

#### **Summary of Program and Rationale**

Until 2000, CSU offered the Major in Statistics as an undergraduate degree. It was discontinued in Fall 2000 due to action by the Colorado Commission of Higher Education (CCHE). After the major was discontinued, it was immediately recreated as the Statistics Concentration as an option within the Major in Mathematics. Despite this new administrative home of the degree, the core courses have been continually taught by faculty in the Department of Statistics, and the advising is done by the Department of Statistics. In the meantime, the CCHE limit on small majors was rescinded.

Reinstating the Major in Statistics, as being requested here, would involve no new resources but has the potential to result in substantial advantages for CSU. By re-establishing the Major in Statistics, and eliminating the concentration in statistics in the mathematics major, the visibility of the degree and its identity as being separate from a degree in Mathematics will be greatly enhanced. Combined with the increasing demand for statisticians currently underway, this could lead to significant growth in the number of students pursuing a statistics education over the next few years. An undergraduate degree in the Department of Statistics will mean that academic matters of degree content, curriculum design, and student mentoring are determined by faculty immersed specifically in statistics. Statistics faculty will be in a better position to adapt the degree in the future to proactively address dynamic challenges in society that require the academic study of statistics to resolve (e.g. the current emphasis on "Big Data").

The Major in Statistics enables students to mix interests in mathematical and computer sciences with a variety of real applications. While statistics is closely related to mathematics as a discipline, the skills needed to be a successful statistician are substantially different from those for a mathematician. Most universities with departments of statistics therefore separate the two curricula and corresponding degrees. The current request is for Colorado State University to do the same.

Statisticians currently work in almost every sector of our society including industry, business, medicine, economics, meteorology, environmental studies, wildlife biology, fisheries, government, and market research. The Occupational Outlook Handbook of the Bureau of Labor Statistics projects increasing demand for statisticians: "Job prospects for statisticians will be very good. Growth will result from more widespread use of statistical analysis to make informed decisions. In addition, the large increase in available data from the Internet will open up new areas for analysis." (see <http://www.bls.gov/ooh/math/statisticians.htm>).

While currently most statisticians entering the marketplace have a graduate degree, programs offering undergraduate degrees in statistics have also had excellent success placing their graduates in industry and government. While we intend to prepare students majoring in Statistics for immediate employment as an entry-level statistician, the proposed degree is also structured to allow students wishing to move on to an M.S. in statistics to do so with minimum effort.

## 2. Fit with CSU Role and Mission and University's Most Current Strategic Plan

The state statute establishing CSU's current role and mission provides (section 23-31-101, Colorado Revised Statutes of 2003):

*There is hereby established a university at Fort Collins to be known as Colorado state university. Colorado state university shall be a comprehensive graduate research university with selective admission standards offering a comprehensive array of baccalaureate, master's, and doctoral degree programs. Consistent with the tradition of land grant universities, Colorado state university has exclusive authority to offer graduate and undergraduate programs in agriculture, forestry, natural resources, and veterinary medicine. The Colorado commission on higher education, in consultation with the board of governors of the Colorado state university system, shall designate those graduate level programs that are the primary responsibility of Colorado state university..*

Given the increasing demand for statisticians, offering students the opportunity to become educated in the discipline of statistics is very much consistent with CSU's role and mission as a "comprehensive graduate research university" mentioned in the statute. While this education is currently being provided through the Concentration in Statistics as part of the BS in Mathematics, this does not provide full recognition of this education: it appears to be effectively subsumed within the discipline of mathematics, and in contrast, modern statistics is now much broader, includes aspects of computer science and decision theory, and is more interdisciplinary.

The Department of Statistics at CSU is highly ranked nationally and internationally for its research excellence, so it makes sense of CSU to leverage this in-house resource by providing undergraduate students the opportunity to pursue a degree in this discipline. By currently providing a statistics education only as a sub-specialty within mathematics, the potential value of having a degree in statistics from CSU is diluted.

As further described in item (5) below, there is only one public university in Colorado offering a degree in Statistics, the Colorado School of Mines. Given its somewhat specialized nature, this institution is unlikely to be currently absorbing the full potential demand for statistical education in the state. The Department of Statistics is the only Department of Statistics in Colorado and the top-ranked department in the Inter-mountain West region. Our much smaller, and much lower ranked peer institutions in neighboring states (Wyoming, New Mexico) offer undergraduate degrees in Statistics. In order to maintain our position as the top Department of Statistics in the inter-mountain West, we should offer such a degree as well.

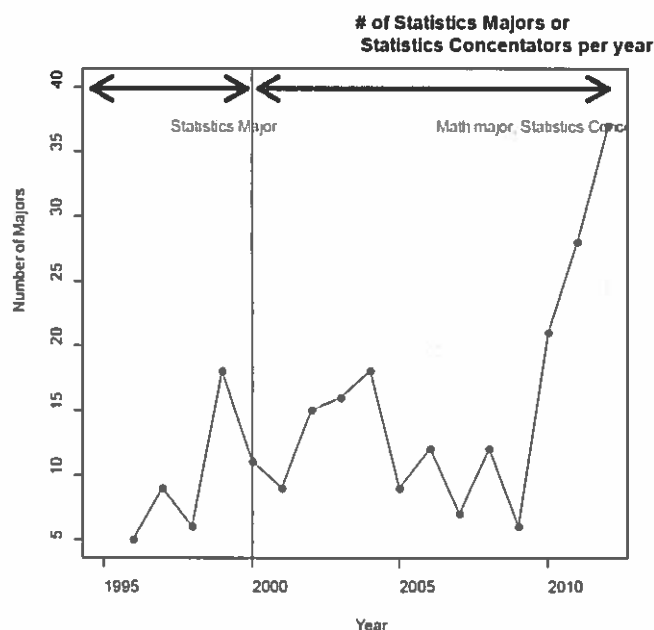


### 3. Evidence of Need for the Program

As noted in (1) above, the demand for statisticians is expected to continue to increase nationwide. While hard numbers are not easy to come by at the undergraduate level, both our experience with students graduating with the Major in Mathematics with Concentration in Statistics and conversations with people at other departments of statistics in the US indicate strong and growing demand for entry-level statisticians with undergraduate degrees. Since the current request is for the cost-free move of a degree from one academic unit to another, we hope that the lack of specific data on the external demand for undergraduate statisticians does not constitute an impediment for considering this request.

### 4. Evidence of Student Demand

The Statistics Major and Concentration have experienced strong growth in recent years, as the chart below shows. One important driver of this growth is the China Strategic Partnership (CSP), which has brought more students on campus with interest in statistics. As CSU expands its international presence into other parts of the world, we expect that this interest in statistics will likewise continue to increase.



### 5. Duplication/Similar Programs in the State

The following schools in Colorado offer degrees most closely related to the requested Major in Statistics:

- UC Denver: offers Actuarial Science option and Probability & Statistics option as Concentrations for BS in Mathematics. Also offers an undergraduate certificate in applied statistics.
- UC Boulder: offers degrees in Actuarial Studies and Quantitative Finance.
- CO School of Mines: Undergraduate degree in Statistics.
- Metropolitan State U of Denver: Major in Mathematics with Statistics and Probability Concentration
- U of Northern CO: Major in Mathematics with Applied Statistics Concentration
- Western State Colorado U: no similar degrees offered

In this list, the program at Colorado School of Mines is the most similar to the one we plan to offer. However, given the specialized nature of that institution, it is unlikely that both programs would compete with each other.

### **Return on Investment Table**

No return on investment is provided, since no new funds are requested.

**Appendix****A. Letters of support**

- i. Dean of the College of Natural Sciences Janice Nerger
- ii. Dean of Libraries Patrick Burns
- iii. Chairman of the Department of Mathematics Gerhard Dangelmayr
- iv. Chairman of the Department of Computer Science Darrell Whitley

**B. Faculty Vitae****C. Documents for the undergraduate major**

- i. Statistics Concentration in Mathematics Checksheet
- ii. CSU General Catalog: Statistics concentration
- iii. CSU General Catalog: Statistics undergraduate courses
- iv. CSU General Catalog: Mathematics undergraduate courses (some are required for the proposed Statistics major)

July 1, 2012

TO: Alan Lamborn, Vice Provost for Undergraduate Affairs

FROM: Janice Nerger, Dean of Natural Sciences 

SUBJECT: Proposal, Undergraduate Major in Statistics

Thirteen years ago the Colorado Commission of Higher Education eliminated the undergraduate major in Statistics, replacing it with a concentration within the Department of Mathematics. Since 2000, technology has advanced to where statistics now plays an even more critical role in the curriculum of many university majors such as mathematics, computer science, biology, and atmospheric science.

The disciplines within Statistics are diverse and growing rapidly, and so is the market for statisticians. Because data sets are now so large and complex and its collection and analytics moving forward so quickly, we believe Colorado State must take the lead and reestablish this undergraduate major in order to provide our students with as strong and a marketable a degree as possible, the Bachelor of Science in Statistics.

I strongly support the reestablishment of the undergraduate major in statistics.



May 29, 2013

University Libraries  
Fort Collins, Colorado 80523-1019  
(970) 491-1838  
FAX: (970) 491-1195  
<http://lib.colostate.edu>

## Memorandum

To: Statistics Department  
CC: Michelle Wilde  
From: Patrick J. Burns, Dean of CSU Libraries  
RE: New Undergraduate Statistics Major

*Patrick J. Burns*

The CSU Library, with guidance from the Statistics subject-matter librarian, Michelle Wilde, has conducted a detailed analysis of its collections needed to support the proposed undergraduate major in statistics. The finding is

"No new information resources or financial support will be required in support of the establishment of the Statistics major."

We are very supportive of this new major. Please do not hesitate to inquire should you have questions. We should be happy to be contacted for additional information.

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Department of Mathematics  
1874 Campus Delivery  
Fort Collins, CO 80523-1874  
Telephone: (970) 491-1303  
FAX: (970) 491-2161  
<http://www.math.colostate.edu>

#### MEMORANDUM

To: Jean Opsomer, Chair, Department of Statistics  
From: Gerhard Dangelmayr, Chair, Department of Mathematics

A handwritten signature in black ink, reading "Gerhard Dangelmayr".

Date: May 6, 2013  
Re: Proposed Major in Statistics.

This memo serves to express my support of the proposed B.S. degree program of a Major in Statistics by the Department of Statistics. The Major in Statistics was discontinued in 2000 by the Colorado Commission of Higher Education and was recreated as Concentration in Statistics within the Major in Mathematics. The Department of Mathematics currently administers this concentration, while the advising of students and oversight of the curriculum is pursued by the faculty of the Department of Statistics. With the increased demand of a B.S. degree in statistics, it is timely and appropriate to reintroduce a Major in Statistics administered by the Department of Statistics. This major offers students the possibility to earn degrees in Mathematics and Statistics, which will be beneficial for both departments.

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Computer Science Department  
1873 Campus Delivery  
Fort Collins, Colorado 80523-1873  
(970) 491-5792  
FAX: (970) 491-2466  
<http://www.cs.colostate.edu>

This is a letter of support from the Department of Computer Science for reinstating the undergraduate major in Statistics at Colorado State University. Statistics has always been about understanding data and extracting information from data. But statistics has become increasingly vital to disciplines and businesses that have access to large or extremely large amounts of data. Currently this is being expressed as "Big Data" and "Data Mining." This also vitally connects statistics with computer science. Processing large data sets is only possible with a combination of computing and statistical tools.

There is no doubt that there is great demand for students and professionals with a solid foundation in statistics. We need to make the opportunity to major in Statistics available to students, and then make the students aware of the great opportunities that are afforded by a degree in Statistics. As with computing and other STEM disciplines, it can be argued that having more well trained professionals with a foundation in statistics is important to the economy of Colorado and the nation.

Respectfully,

Darrell Whitley  
Chair and Professor  
Department of Computer Science

**Short CVs for the faculty of the Department of Statistics  
June 2013**

**Regular Core Faculty**

Name	Position	Degree	Area of specialization
Breidt, F. Jay	Tenured	PhD	Environmental and ecological statistics, time series, surveys
Chapman, Phil	Tenured	PhD	Applied linear modeling, statistical consulting
Cooley, Dan	Tenured	PhD	Extreme values, spatial statistics, environmental applications
Estep, Don	Tenured	PhD	Computational differential equations, dynamical systems
Givens, Geof	Tenured	PhD	Statistical conservation biology, statistical computing
Hoeting, Jennifer	Tenured	PhD	Bayesian statistics, model selection and uncertainty
Homrighausen, Darren	Tenure-Track	PhD	Astrostatistics, inverse problems, asymptotic theory
Kokoszka, Piotr	Tenured	PhD	Time series analysis, functional data analysis, asymptotic theory
Lee, Chihoon	Tenure-Track	PhD	Probability, stochastic analysis, queueing networks, stochastic control
Lee, Myung-Hee	Tenure-Track	PhD	Statistical theory, multivariate analysis, bioinformatics
Meyer, Mary	Tenured	PhD	Nonparametric function estimation and inference
Opsomer, Jean	Tenured	PhD	Survey Statistics, nonparametric statistics, environmental stat
Wang, Haonan	Tenured	PhD	functional data analysis and application, multivariate analysis

**Other Department Faculty**

Anderson, Jana	Special	PhD	Developments in Statistical Education (no teaching)
Dahlke, Mark	Special	PhD	Nonparametric statistics, survey statistics, education
Green, Gerwyn	Special	PhD	Mixed modeling, multiple testing, medical statistics
Hess, Ann	Special	PhD	Bioinformatics, experimental design, linear models
Zumbrunnen, Jim	Special	MS	General statistical consulting (no teaching)

CVs on pages 24-71 are available  
on request.



**COLORADO STATE UNIVERSITY**  
**MATHEMATICS MAJOR - CONCENTRATION IN STATISTICS**  
**MATH - STAZ**

NAME: \_\_\_\_\_ CSUID: \_\_\_\_\_ ADVISER: \_\_\_\_\_ TERM OF GRAD: \_\_\_\_\_

LOCAL ADDRESS: \_\_\_\_\_ ZIP: \_\_\_\_\_ PH: \_\_\_\_\_ E-Mail: \_\_\_\_\_

Adviser: Mark Dahlke

Room 104 Statistics

Phone: 491-5330

E-mail: [mark.dahlke@colostate.edu](mailto:mark.dahlke@colostate.edu)

Program Coordinator: Kristin Stephens

Room 102 Statistics

Phone: 491-5269

E-mail: [stephens@stat.colostate.edu](mailto:stephens@stat.colostate.edu)

CORE COURSES (30 credits)	MATHEMATICAL SCIENCES (56 credits) (Grade of C or higher required in all Mathematics, Computer Science, Statistics courses in this column)	ADDITIONAL COURSES (34 credits)
<b>FRESHMAN SEMINAR</b> <span style="float: right;"><b>2</b></span>	<b>MATHEMATICS</b> <span style="float: right;"><b>19</b></span>	<b>UNRESTRICTED ELECTIVES</b> <span style="float: right;"><b>34</b></span>
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<b>COMMUNICATION</b> <span style="float: right;"><b>6</b></span> <div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> CO 150 College Composition                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> JTC 300 Prof. and Tech. Comm.                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [3]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [3]                 </div> </div> </div>	<b>STATISTICS</b> <span style="float: right;"><b>24</b></span> <div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> STAT 301 Intro to Statistical Methods                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> STAT/ERHS 307 Intro to Biostatistics                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> STAT 315 (309) Statistics for Eng &amp; Sci                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [3]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [3]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [3]                 </div> </div> </div>	<div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> </div> </div>
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<b>ARTS/HUMANITIES</b> <span style="float: right;"><b>6</b></span> Select one course from 3-B <div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> </div> </div>	Take all of the following: <div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> STAT 340 (304) Multiple Regression Analysis                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> STAT 350 (302) Design of Experiments                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> STAT 420 Probability/Math Stat I                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> STAT 430 Probability/Math Stat II                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> STAT 372 (310) Data Analysis Tools                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> STAT 472 Statistical Consulting                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [3]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [3]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [3]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [3]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [3]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [3]                 </div> </div> </div>	<b>GRADUATION REQUIREMENTS</b> Total credits..... <input type="checkbox"/> (at least 120 credits) Upper-Division credits..... <input type="checkbox"/> (at least 42 credits) CSU GPA..... <input type="checkbox"/> (at least 2.0) MATH 117, MATH 118, MATH 120, MATH 121, MATH 124, MATH 125 and MATH 126 are considered review courses by the Department of Mathematics. Credits in these courses may not be used as part of a degree in math. Transfer students must complete a minimum of 9 upper-division credits in mathematics at CSU, excluding MATH 315, MATH 340, and mathematics courses ending in -80 to -99. See the Colorado State University General Catalog for a complete statement of graduation requirements. Visit the Math Department web site for information on updated courses and requirements: <a href="http://www.math.colostate.edu">www.math.colostate.edu</a>
<b>SOCIAL/BEHAVIORAL SCIENCES</b> <span style="float: right;"><b>3</b></span> Select one course from 3-C <div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> </div> </div>	<b>COMPUTER SCIENCE</b> <span style="float: right;"><b>4</b></span> <div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> CS 160 Foundations in Programming                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [4]                 </div> </div> </div>	
<b>HISTORICAL PERSPECTIVES</b> <span style="float: right;"><b>3</b></span> Select one course from 3-D <div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> </div> </div>	<div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> CS 155 Introduction to Unix                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> CS 156 Introduction to C Programming I                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [1]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [1]                 </div> </div> </div>	
<b>GLOBAL/CULTURAL AWARENESS</b> <span style="float: right;"><b>3</b></span> Select one course from 3-E <div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> </div> </div>	And two of the following: <div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> CS 157 Introduction to C Programming II                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> MATH 151 Math. Algorithms in Matlab I                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> MATH 152 Math. Algorithms in Maple                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> MATH 158 Math Algorithms in C                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [1]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [1]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [1]                 </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> [1]                 </div> </div> </div>	
<b>MINOR, SECOND MAJOR</b> MINOR: _____ SECOND MAJOR: _____ The program of study shown is subject to approval by the University Curriculum Committee	<b>MATH SCIENCE ELECTIVES</b> <span style="float: right;"><b>9</b></span> Upper division computer science, mathematics, or statistics courses (excluding courses ending in -80 to -99 and MATH 315) <div style="display: flex; justify-content: space-between;"> <div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> <div style="display: flex; align-items: center;"> <input type="checkbox"/> _____                 </div> </div> <div style="text-align: right;"> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> <div style="display: flex; align-items: center;"> <div style="width: 100px;"></div> <input type="checkbox"/> </div> </div> </div>	

## College of Natural Sciences

Course	Title	Cr	AUCC
	Electives <sup>1</sup>	3	
	TOTAL	30	
<b>JUNIOR</b>			
ECE 311 <sup>†</sup>	Linear System Analysis I <sup>†</sup>	3	
MATH 301 <sup>†</sup>	Introduction to Combinatorial Theory	3	
MATH 317 <sup>†</sup>	Advanced Calculus of One Variable	4	4B
MATH 360 <sup>†</sup>	Mathematics of Information Security	3	
	Biological/physical science <sup>2</sup>	7	3A
	Electrical engineering/mathematical science elective <sup>3</sup>	3	
	Electives <sup>1</sup>	7	
	TOTAL	30	
<b>SENIOR</b>			
ECE 312 <sup>†</sup>	Linear System Analysis II	3	
MATH 460 <sup>†</sup>	Information and Coding Theory	3	4C
Select one of the following:			
STAT 303 <sup>†</sup>	Introduction to Communications	3	
ECE 303 <sup>†</sup>			
STAT 321 <sup>†</sup>	Elementary Probabilistic-Stochastic Modeling	3	
STAT 340 <sup>†</sup>	Multiple Regression Analysis	3	
	Electrical engineering/mathematical science electives <sup>3</sup>	9	
	Electives <sup>1</sup>	12	
	TOTAL	30	

PROGRAM TOTAL = 120 credits

<sup>†</sup> This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.<sup>1</sup> Select from the list of courses in category 3B in the All-University Core Curriculum (AUCC). Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L\* 200 and L\* 201) foreign language courses.<sup>2</sup> Select from the list of courses in category 3E in the AUCC.<sup>3</sup> Select from the list of courses in category 3D in the AUCC.<sup>4</sup> Select from the list of courses in category 3C in the AUCC.<sup>5</sup> Enough elective credits need to be selected to bring the program total to 120 credits with a minimum of 42 upper-division credits.<sup>6</sup> Students in this concentration may need to obtain a prerequisite override from the appropriate department to enroll in this course.<sup>7</sup> Select two courses from the list of courses in category 3A in the AUCC. One course must include a lab. Courses must be selected from two different prefixes.<sup>8</sup> Select a total of 12 credits from (A) and (B), with 6 or more coming from (A): (A) upper-division mathematics courses except those ending in -80 to -99; (B) upper-division ECE, CS, MATH, or STAT courses, except those ending in -80 to -99..)

## Statistics Concentration

Statistics provides the reasoning and the methods for producing and understanding data; it is the science of learning from data. It includes designing experiments or sampling surveys for the collection of data, collecting the information, evaluating it, drawing conclusions, and presenting the results. Statisticians work with people from other professional backgrounds to solve practical problems. Statisticians can provide crucial guidance in determining what information is reliable and which predictions can be trusted. This diversity of application is an exciting aspect of the field, and is one reason for continuing strong demand for well-trained statisticians.

A minimum grade of C is required in all mathematics, statistics, and computer science courses which are required for graduation.

Course	Title	Cr	AUCC
<b>FRESHMAN</b>			
CO 150 <sup>†</sup>	College Composition	3	1A
MATH 160 <sup>†</sup>	Calculus for Physical Scientists I	4	1B
MATH 161 <sup>†</sup>	Calculus for Physical Scientists II	4	1B

Course	Title	Cr	AUCC
MATH 192	First Year Seminar in Mathematical Sciences	1	
STAT 192	First Year Seminar in Mathematical Sciences	1	
	Global and Cultural Awareness <sup>1</sup>	3	3E
	Historical Perspectives <sup>2</sup>	3	3D
	Electives <sup>3</sup>	9	
	TOTAL	28	
<b>SOPHOMORE</b>			
JTC 300 <sup>†</sup>	Professional and Technical Communication	3	2
MATH 261 <sup>†</sup>	Calculus for Physical Scientists III	4	
Select one course from the following:			
STAT 301 <sup>†</sup>	Introduction to Statistical Methods	3	
STAT 307/ERHS 307 <sup>†</sup>	Introduction to Biostatistics	3	
STAT 315 <sup>†</sup>	Statistics for Engineers and Scientists	3	
	Biological and Physical Sciences <sup>4</sup>	7	3A
	Introductory programming <sup>5</sup>	4	
	Electives <sup>3</sup>	9	
	TOTAL	30	
<b>JUNIOR</b>			
MATH 317 <sup>†</sup>	Advanced Calculus of One Variable	4	
Select one course from the following:			
STAT 305 <sup>†</sup>	Sampling Techniques	3	
STAT 321 <sup>†</sup>	Elementary Probabilistic-Stochastic Modeling	3	
STAT 460 <sup>†</sup>	Applied Multivariate Analysis	3	
STAT 340 <sup>†</sup>	Multiple Regression Analysis	3	
STAT 350 <sup>†</sup>	Design of Experiments	3	
	Arts and Humanities <sup>6</sup>	6	3B
	Social and Behavioral Sciences <sup>7</sup>	3	3C
	Upper division CS/MATH/STAT electives <sup>8</sup>	6	
	Electives <sup>1</sup>	3	
	TOTAL	31	
<b>SENIOR</b>			
MATH 369 <sup>†</sup>	Linear Algebra	3	
STAT 372 <sup>†</sup>	Data Analysis Management Tools	3	
STAT 420 <sup>†</sup>	Probability and Mathematical Statistics I	3	
STAT 430 <sup>†</sup>	Probability and Mathematical Statistics II	3	4A
STAT 472 <sup>†</sup>	Statistical Consulting	3	4A, 4B, 4C
	Upper division CS/MATH/STAT elective <sup>9</sup>	3	
	Electives <sup>1</sup>	13	
	TOTAL	31	

PROGRAM TOTAL = 120 credits

<sup>†</sup> This course has at least one prerequisite. Check the Courses of Instruction section of the catalog or <http://catalog.colostate.edu/> to see the course prerequisites.<sup>1</sup> Select from the list of courses in category 3E in the All-University Core Curriculum (AUCC).<sup>2</sup> Select from the list of courses in category 3D in the AUCC.<sup>3</sup> Select enough elective credits to bring the program total to a minimum of 120 credits with a minimum of 42 upper-division credits.<sup>4</sup> Select from the list of courses in category 3A in the AUCC. One course must have a laboratory component.<sup>5</sup> Students must take either CS 160 (4 credits) or CS 155 and CS 156 plus two of the following courses: CS 157, MATH 151, MATH 152, and/or MATH 158/CS 158.<sup>6</sup> Select two courses from the list in category 3B in the AUCC. Only 3 of the 6 credits required for Arts and Humanities may come from intermediate (L\* 200 and L\* 201) foreign language courses.<sup>7</sup> Select from the list of course in category 3C in the AUCC.<sup>8</sup> Upper-division computer science, mathematics, or statistics courses (excluding courses ending in -80 to -99).

## Minor in Mathematics

The Mathematics Department offers a minor in Mathematics for those students who wish to acquire a more extensive knowledge of mathematical sciences in

## STATISTICS COURSES

### *Department of Statistics College of Natural Sciences*

**STAT 101 03(2-2-0). Activity Based Statistics.** F, SS. Credit not allowed for students who have already taken any 200-level or higher statistics course.

Population, sample, variation, data, relationships, probability and risk, polls, prediction, margin of error, critical assessment of studies.

**STAT 110 03(2-0-1). Statistical Thinking: Concepts and Applications.** S. Credit not allowed for students who have already taken any 200-level or higher statistics course.

Use of statistical tools in real-life problems using computer packages; integration of critical thinking skills using case studies.

**STAT 192 01(0-0-1). First-Year Seminar in Mathematical Sciences.** S.

Richness and variety of problems encountered in the mathematical sciences.

**STAT 201 03(2-0-1). General Statistics.** F, S, SS. Prerequisite: Mathematics placement exam or one credit of 100-level mathematics. Credit not allowed for both STAT 201 and STAT 204. Intended as a one semester terminal course.

Graphs, descriptive statistics, confidence intervals, hypothesis tests, correlation and simple regression, tests of association.

**STAT 204 03(2-2-0). Statistics for Business Students.** F, S, SS. Prerequisite: Mathematics placement exam or one credit of 100-level mathematics. Credit not allowed for both STAT 204 and STAT 201.

Surveys, sampling, descriptive statistics, confidence intervals, contingency tables, control charts, regression, exponential smoothing, forecasting.

**STAT 301 03(3-0-0). Introduction to Statistical Methods.** (GT-MA1) F, S, SS. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Techniques in statistical inference; confidence intervals, hypothesis tests, correlation and regression, analysis of variance, chi-square tests. (NT-V)

**STAT 303/ECE 303 03(3-0-0). Introduction to Communications Principles.** F. Prerequisite: ECE 311 or concurrent registration; MATH 261. Credit not allowed for both STAT 303 and ECE 303.

Basic concepts in design and analysis of communication systems.

**STAT 305 03(3-0-0). Sampling Techniques.** F. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Sample designs: simple random, stratified, systematic, cluster, unequal probability, two phase; methods of estimation and sample size determination.

**STAT 307 03(3-0-0). Introduction to Biostatistics.** F, S, SS. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Biostatistical methods; confidence intervals, hypothesis tests, simple correlation and regression, one-way analysis of variance.

**STAT 311 03(3-0-0). Statistics for Behavioral Sciences I.** F, S. Prerequisite: MATH 117 or MATH 118 or MATH 124 or MATH 125 or MATH 126 or MATH 141 or MATH 155 or MATH 160. Credit allowed for only one of the following: ERHS 307, STAT 301, STAT 307, STAT 311, or STAT 315.

Classification, descriptive statistics; inference, testing, estimation; categorical data analysis; odds ratio.

**STAT 312 03(3-0-0). Statistics for Behavioral Sciences II.** F, S. Prerequisite: STAT 311.

One-way analysis of variance, factorial designs, blocked designs, multiple comparisons of means, and multiple regression.

**STAT 315 03(3-0-0). Statistics for Engineers and Scientists.** F, S, SS. Prerequisite: MATH 161 or MATH 255. Credit allowed for only one course: ERHS 307, STAT 301, STAT 307, STAT 311, STAT 315.

Calculus-based probability and statistics: distribution theory, estimation, hypothesis testing, applications to engineering and the sciences. (NT-V)

**STAT 321 03(3-0-0). Elementary Probabilistic-Stochastic Modeling.** S. Prerequisite: CS 156 or CS 160 or MATH 151 or MATH 152; MATH 155 or MATH 160.

Probabilistic and stochastic models of real phenomena; distributions, expectations, correlations; averages; simple Markov chains and random walks.

**STAT 340 03(3-0-0). Multiple Regression Analysis.** S, SS. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Estimation and testing for linear, polynomial, and multiple regression models; analysis of residuals; selection of variables; nonlinear regression.

**STAT 350 03(3-0-0). Design of Experiments.** F, SS. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Analysis of variance, covariance; randomization; completely randomized, randomized block, latin-square, split-plot, factorial and other designs.

**STAT 372 03(3-0-0). Data Analysis Tools.** F. Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Data analysis principles and practice, statistical packages and computing; ANOVA, regression and categorical data methods.

**STAT 420 03(3-0-0). Probability and Mathematical Statistics I.** F. Prerequisite: MATH 255 or MATH 261.

Probability, random variables, distribution functions, and expectations; joint and conditional distributions and expectations; transformations.

**STAT 430 03(3-0-0). Probability and Mathematical Statistics II.** S. Prerequisite: STAT 420.

Theories and applications of estimation, testing, and confidence intervals; sampling distributions including normal, gamma, beta,  $\chi^2$ , t, and F.

**STAT 460 03(3-0-0). Applied Multivariate Analysis.** S. Prerequisite: STAT 340.

Principles for multivariate estimation and testing; multivariate analysis of variance, discriminant analysis; principal components, factor analysis. (NT-V)

**STAT 472 03(0-0-3) Statistical Consulting.** S. Prerequisite: STAT 372.

Statistical consulting skills including data analysis, problem solving, report writing, oral communication, and planning experiments.

**STAT 495 Var. Independent Study.** Prerequisite: Written consent of instructor.

**STAT 498 Var [1-3]. Undergraduate Research in Statistics.** Prerequisite: Written consent of instructor.

Research skills and techniques; include both oral and written communication of results.

**STAT 500 01(0-2-0). Statistical Computer Packages.** S. Prerequisite: STAT 340; STAT 350.

Comparison, evaluation, and use of computer packages for univariate and multivariate statistical analyses.

**STAT 501 01(1-0-0). Statistical Science.** F.

Overview of statistics: theory; use in agriculture, business, environment.

\*Alternate year offering (odd); \* Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCC-subcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

engineering; modeling; computing; statisticians as researchers/consultants.

**STAT 511 04(3-0-1). Design and Data Analysis for Researchers I. F.** Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315.

Statistical methods for experimenters and researchers emphasizing design and analysis of experiments. (NT-V)

**STAT 512 04(3-0-1). Design and Data Analysis for Researchers II. S.** Prerequisite: STAT 511.

Statistical methods for experimenters and researchers emphasizing design and analysis of experiments.

**STAT 514/SOCR 514 04(3-3-0). Agricultural Experiment Design and Analysis. S.** Prerequisites: STAT 201 or STAT 301 or STAT 307. Credit allowed for only one of the following: SOCR 414, SOCR 514, STAT 350, or STAT 514.

Design and implementation of agricultural experiments and statistical analysis of resulting data.

**STAT 515 03(2-2-0). Statistical Science and Process Improvement. S.** Prerequisite: QNT 570 or STAT 511 or STAT 540.

Statistical methods in process design; statistical methods; measurement processes; customer evaluation.

**STAT 520 04(4-0-0). Introduction to Probability Theory. F.** Prerequisite: MATH 369; MATH 261; MATH 317.

Probability, random variables, distributions, expectations, generating functions, limit theorems, convergence, random processes.

**STAT 521 03(3-0-0). Stochastic Processes I. S.** Prerequisite: STAT 520.

Characterization of stochastic processes, Markov chains in discrete and continuous time, branching processes, renewal theory, Brownian motion.

**STAT 522 03(3-0-0). Stochastic Processes II. F, SS.** Prerequisite: STAT 521.

Martingales and applications, random walks, fluctuation theory, diffusion processes, point processes, queueing theory.

**STAT 523/NR 523 03(3-0-0). Quantitative Spatial Analysis. S.** Prerequisite: STAT 301 or STAT 307. Credit not allowed for both STAT 523 and NR 523.

Techniques in spatial analysis: point pattern analysis, spatial autocorrelation, trend surface and spectral analysis.

**STAT 524/FIN 524 03(3-0-0). Financial Statistics. F.** Prerequisite: MATH 345; STAT 420, or Admission to MSBA program with Financial Risk Management specialization.

Probability and statistical concepts and quantitative tools used in financial modeling and decision-making.

**STAT 525 03(3-0-0). Analysis of Time Series I. F.** Prerequisite: STAT 430.

Trend and seasonality, stationary processes, Hilbert space techniques, spectral distribution function, fitting ARIMA models, linear prediction.

**STAT 526 03(3-0-0). Analysis of Time Series II. S, SS.** Prerequisite: STAT 525.

Spectral analysis; the periodogram; spectral estimation techniques; multivariate time series; linear systems, optimal control; Kalman filtering, prediction.

**STAT 530 03(3-0-0). Mathematical Statistics. S.** Prerequisite: STAT 520.

Sampling distributions, estimation, testing, confidence intervals; exact and asymptotic theories of maximum likelihood and distribution-free methods.

**STAT 540 03(3-0-0). Data Analysis and Regression. F.** Prerequisite: Six credits of upper-division statistics courses.

Introduction to multiple regression and data analysis with emphasis on graphics and computing.

**STAT 544/ERHS 544 03(3-0-0). Biostatistical Methods for Quantitative Data. S.** Prerequisite: STAT 301 or STAT 307. Credit not allowed for both STAT 544 and ERHS 544.

Regression and analysis of variance methods applied to both observational studies and designed experiments in the biological sciences.

**STAT 547/CIVE 547 03(3-0-0). Statistics for Environmental Monitoring. S.** Prerequisite: STAT 301. Credit not allowed for both STAT 547 and CIVE 547.

Applications of statistics in environmental pollution studies involving air, water, or soil monitoring; sampling designs; trend analysis; censored data.

**STAT 548/CS 548 04(3-2-0). Bioinformatics Algorithms. F.** Prerequisite: STAT 301 or STAT 307 or STAT 315; knowledge of a contemporary programming language.

Computational methods for analysis of DNA/protein sequences and other biological data.

**STAT 560 03(3-0-0). Applied Multivariate Analysis. F, S.** Prerequisite: STAT 520; STAT 540.

Multivariate analysis of variance; principal components; factor analysis; discriminant analysis; cluster analysis. (NT-O/V)

**STAT 570 03(3-0-0). Nonparametric Statistics. S, SS.** Prerequisite: STAT 430.

Distribution and uses of order statistics; nonparametric inferential techniques, their uses and mathematical properties. (NT-V)

**STAT 586 01(0-2-0). Practicum In Consulting Techniques. F, S, SS.** Prerequisite: STAT 540.

Instruction on planning studies, writing reports, and interacting with clients. Attend and critique consulting sessions.

**STAT 592 01(0-0-1). Seminar.**

**STAT 600 03(3-0-0). Statistical Computing. F, S.** Prerequisite: STAT 520; STAT 540.

Optimization and integration in statistics; Monte Carlo methods; simulation; bootstrapping; density estimation; smoothing.

**STAT 604/BUS 604 02(2-0-0). Managerial Statistics. F.** Prerequisite: Admission to the MBA Program. Credit not allowed for both STAT 604 and BUS 604.

Introduction to statistical thinking and methods used to support managerial-decision making. (NT-V)

**STAT 605 03(3-0-0). Theory of Sampling Techniques. S.** Prerequisite: STAT 301 or STAT 307 or STAT 311 or STAT 315; STAT 430.

Survey designs; simple random, stratified, cluster samples; theory of estimation; optimization techniques for minimum variance or costs.

**STAT 640 04(4-0-0). Design and Linear Modeling I. S.** Prerequisite: MATH 369; STAT 540.

Introduction to linear models; experimental design; fixed, random, and mixed models.

**STAT 645 03(3-0-0). Categorical Data Analysis and GLIM. S.** Prerequisite: Concurrent registration in STAT 640.

Generalized linear models, binary and polytomous data, log linear models, quasilielihood models, survival data models.

**STAT 650 03(3-0-0). Design and Linear Modeling II. F.** Prerequisite: STAT 640.

Mixed factorials; response surface methodology; Taguchi methods; variance components.

**STAT 675A-L Var [1-3]. Topics In Statistical Methods. F, S, SS.** Prerequisite: STAT 430.

A) Sampling. B) Design. C) Multivariate and regression methods. D)

\* Alternate year offering (odd); \* Alternate year offering (even); + Field trips, S Special course fee, NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

## MATHEMATICS COURSES

### Department of Mathematics College of Natural Sciences

**MATH 117 01(1-0-0).** College Algebra in Context I. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: Mathematics Placement Examination.

Functions as mathematical models. Linear, quadratic, and polynomial functions considered symbolically, graphically, numerically, and contextually.

**MATH 118 01(1-0-0).** College Algebra in Context II. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 117.

Reciprocals of linear functions, rational functions, and power functions considered symbolically, graphically, numerically, and contextually.

**MATH 122/CS 122 01(0-0-1).** Theory for Introductory Programming. F, S, SS. Prerequisite: MATH 118; concurrent registration in CS 161. Credit not allowed for both MATH 122 and CS 122. Credit not allowed for students who have completed CS 160.

Set theory, definitions operations, Venn diagrams, power sets, propositional logic and proofs. Functions; loop invariants. (NT-O)

**MATH 124 01(1-0-0).** Logarithmic and Exponential Functions. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 118 or placement.

Definition and graphs of exponential and logarithmic functions, properties of logarithmic functions, exponential and logarithmic equations, applications.

**MATH 125 01(1-0-0).** Numerical Trigonometry. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 118 or placement.

Definition and graphs of trigonometric functions, laws of sines and cosines, solutions of right and oblique triangles, applications.

**MATH 126 01(1-0-0).** Analytic Trigonometry. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 125 or placement.

Inverse trigonometric functions, trigonometric identities, solving trigonometric equations.

**MATH 130 03(2-2-0).** Math in the Social Sciences. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: Mathematics Placement Examination.

Voting theory, power indices, fair division, apportionment, circuits and trees, list processing, descriptive statistics, probability.

**MATH 133 03(2-2-0).** Financial Mathematics. (GT-MA1, AUCC 1B). F. Prerequisite: Mathematics Placement Examination. Calculator required.

Pricing, taxes, insurance, interest, annuities, amortization, investments using financial calculators and spreadsheets.

**MATH 135 03(2-0-1).** Patterns of Phenomena. (GT-MA1, AUCC 1B). S. Prerequisite: Mathematics Placement Examination.

Applications of mathematical ideas and mode of thought in the arts and humanities, focusing on classification, recognition.

**MATH 141 03(3-0-0).** Calculus in Management Sciences. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 118. Credit allowed for only one of the following courses: MATH 141, MATH 155, or MATH 160.

Analytic geometry, limits, equilibrium of supply and demand, differentiation, integration, applications of the derivative, integral.

**MATH 151 01(0-2-0).** Mathematical Algorithms in Matlab I. S. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Statements, expressions and variable assignments, scripts, control statements and logical statements. Newton's method, Simpson's rule, recursion.

**MATH 152 01(0-2-0).** Mathematical Algorithms in Maple. S. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Iteration and recursion, control and logical statements, expressions, functions, data types, binary numbers, symbolic manipulation of terms.

**MATH 155 04(4-0-0).** Calculus for Biological Scientists I. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 124; MATH 125. Credit allowed for only one of the following courses: MATH 141, MATH 155, or MATH 160.

Limits, continuity, differentiation, and integration of elementary functions with applications in the biosciences. Programmable graphing calculator required.

**MATH 158/CS 158 01(0-2-0).** Mathematical Algorithms in C. S. Prerequisite: CS 156; MATH 151; MATH 160. Credit not allowed for both MATH 158 and CS 158.

Compilers, expressions, variable types, control statements, pointers, logical statements, plotting, secant method, trapezoidal rule, recursion.

**MATH 160 04(3-2-0).** Calculus for Physical Scientists I. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 124; MATH 126. Credit allowed for only one of the following: MATH 141; MATH 155; MATH 160.

Limits, continuity, differentiation, and integration of elementary functions with applications; conic sections.

**MATH 161 04(3-2-0).** Calculus for Physical Scientists II. (GT-MA1, AUCC 1B). F, S, SS. Prerequisite: MATH 124; MATH 160.

Transcendental functions, integration techniques, polar coordinates, sequences and series, with mathematical software.

**MATH 192 01(0-0-1).** First-Year Seminar in Mathematical Sciences. F.

Introduction to the richness and variety of problems addressed by mathematical language and techniques; resources and available careers.

**MATH 229 02(2-0-0).** Matrices and Linear Equations. F, S, SS. Prerequisite: MATH 141 or MATH 155 or MATH 160.

Linear systems, matrix arithmetic, homogeneous coordinates, complex numbers, eigenvalues, eigenvectors, applications to discrete dynamical systems.

**MATH 230 03(2-2-0).** Discrete Mathematics for Educators. F. Prerequisite: EDUC 275 or concurrent registration; MATH 161. Credit allowed for only one of the following: MATH 230, MATH 301, MATH 330.

Voting theory, fair division, graph theory, linear programming, probability, teaching in small groups, proof techniques, mathematical technology.

**MATH 255 04(4-0-0).** Calculus for Biological Scientists II. (GT-MA1, AUCC 1B). F, S. Prerequisite: Concurrent registration in MATH 126, MATH 155. Credit not allowed for both MATH 255 and MATH 261.

Derivatives and integrals of functions of several variables, differential and difference equations, matrices, applications in the biosciences. Programmable graphing calculator required.

**MATH 261 04(4-0-0).** Calculus for Physical Scientists III. F, S, SS. Prerequisite: MATH 161. Credit not allowed for both MATH 261 and MATH 255.

Vector functions, partial differentiation, cylindrical and spherical coordinates, multiple integrals, line integrals. Green's theorem.

**MATH 301 03(3-0-0).** Introduction to Combinatorial Theory. F. Prerequisite: MATH 160. Credit not allowed for both MATH 301 and MATH 330.

Matrices, orthogonal Latin squares, designs, difference sets, sets, binomial coefficients, inclusion and exclusion, recurrence, Ramsey's theorem, SDRs.

**MATH 317 04(4-0-0).** Advanced Calculus of One Variable. F, S, SS. Prerequisite: MATH 161.

Convergence of sequences, series: limits, continuity, differentiation, integration of one-variable functions; development of skills for proving theorems.

**MATH 331 03(3-0-0).** Introduction to Mathematical Modeling. F. Prerequisite: MATH 161 or concurrent registration; MATH 229 or

\*Alternate year offering (odd); \* Alternate year offering (even); + Field trips; \$ Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

concurrent registration or MATH 369 or concurrent registration.

Problem formulation. Modeling, theoretical and empirical. Variable selection. Derivation and simulation of solutions. Model testing including predication.

**MATH 332 03(3-0-0). Partial Differential Equations.** S. Prerequisite: MATH 340 or MATH 345. Credit not allowed for both MATH 332 and MATH 530.

Partial differential equations, separation of variables, Fourier series and transforms, Laplace, heat, and wave equations.

**MATH 340 04(3-2-0). Introduction to Ordinary Differential Equations.** F, S, SS. Prerequisite: MATH 255 or MATH 261. Credit not allowed for both MATH 340 and MATH 345.

First and second order equations, series, Laplace transforms, linear algebra, eigenvalues, first order systems of equations, numerical techniques.

**MATH 345 04(3-2-0). Differential Equations.** F, S. Prerequisite: MATH 161 or MATH 255; MATH 229 or MATH 369. Credit not allowed for both MATH 345 and MATH 340.

First and second order equations, Laplace transforms, first order systems of equations, numerical methods, applied linear algebra, linearization.

**MATH 348/BZ 348 04(3-3-0). Theory of Population and Evolutionary Ecology.** F. Prerequisite: MATH 155 or MATH 160. Credit allowed for only one of the following: MATH 348, BZ 348, BZ 548. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

Principles and methods for building, analyzing, and interpreting mathematical models of ecological and evolutionary problems in biology.

**MATH 360 03(3-0-0). Mathematics of Information Security.** F. Prerequisite: MATH 229 or MATH 369.

Codes, ciphers, Chinese remainder theorem, primality testing, public key ciphers, RSA, finite fields, discrete algorithms, advanced encryption standard.

**MATH 366 03(3-0-0). Introduction to Abstract Algebra.** F, S, SS. Prerequisite: MATH 161.

Sets, integers, polynomials, real and complex numbers, groups, integral domains, and fields; development of skills for proving theorems.

**MATH 369 03(3-0-0). Linear Algebra.** F, S, SS. Prerequisite: MATH 161.

Linear systems, matrices, subspaces of Euclidean spaces, linear transformations on Euclidean spaces, eigenvalues, eigenvectors.

**MATH 384 01(1-0-0). Supervised College Teaching.** F, S. Prerequisite: Written consent of instructor. May not be used to satisfy Mathematics degree requirements. Maximum of 1 credit allowed in course.

Skills for effective tutoring of precalculus mathematics; design and implementation of the Individualized Mathematics Program.

**\*MATH 405 03(3-0-0). Introduction to Number Theory.** S. Prerequisite: MATH 360 or MATH 366.

Diophantine equations; distribution of primes; multiplicative functions; finite fields; quadratic reciprocity; quadratic number fields.

**MATH 417 03(3-0-0). Advanced Calculus I.** F. Prerequisite: MATH 369.

Topology of Euclidean spaces, limits, derivatives and integrals on Euclidean spaces. Implicit functions and the implicit function theorem.

**MATH 418 03(3-0-0). Advanced Calculus II.** S. Prerequisite: MATH 417.

Line and surface integrals, series, sequences and series of functions.

**MATH 419 03(3-0-0). Introduction to Complex Variables.** F. Prerequisite: MATH 261.

Analyticity, Cauchy integral theorem and formula, Taylor and Laurent series, residue calculus, conformal mapping and harmonic functions.

**MATH 425 03(3-0-0). History of Mathematics.** F. Prerequisite: ED 331; two of the following courses: MATH 317, MATH 366, MATH 369.

Historical development of geometry, arithmetic, algebra, and calculus from ancient times to 20th century.

**MATH 430/ECE 430 03(3-0-0). Fourier and Wavelet Analysis with Apps.** S. Prerequisite: MATH 345. Credit not allowed for both MATH 430 and ECE 430.

Fourier analysis and transforms, FFTs; sampling theorems, computational algorithms; wavelets; applications to communication, imaging, and compression.

**MATH 435 03(1-4-0). Projects in Applied Mathematics.** S. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 229 or MATH 369; MATH 340 or MATH 345.

Open-ended projects with emphasis on problem identification and formulation, team approach, and reporting results.

**MATH 450 03(3-0-0). Introduction to Numerical Analysis I.** F. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 255 or MATH 261.

Solutions of systems of linear and nonlinear equations, interpolation, approximation.

**MATH 451 03(3-0-0). Introduction to Numerical Analysis II.** S. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 340 or MATH 345.

Numerical computation of eigenvalues, numerical solution of ordinary and partial differential equations.

**\*MATH 455 03(3-0-0). Mathematics in Biology and Medicine.** F. Prerequisite: MATH 255 or MATH 348/BZ 348 or MATH 340 or MATH 345.

Models in population biology, cell division, host-parasitoid systems, bacterial growth and predator-prey systems.

**MATH 460 03(3-0-0). Information and Coding Theory.** S. Prerequisite: MATH 360, MATH 369; STAT 321.

Entropy, mutual information, channel capacity, channel coding theorem, syndrome decoding, BCH codes, recent developments.

**MATH 466 03(3-0-0). Abstract Algebra I.** F. Prerequisite: MATH 360 or MATH 366 or MATH 369.

Comprehensive introduction to groups, rings, and fields

**MATH 467 03(3-0-0). Abstract Algebra II.** S. Prerequisite: MATH 369 or concurrent registration; MATH 466.

Advanced topics in abstract algebra: Euclidean domains, abstract vector spaces, extension fields, Galois theory.

**MATH 469 03(3-0-0). Linear Algebra II.** S. Prerequisite: MATH 369.

Abstract vector spaces, general theory of linear transformations, theory of determinants, canonical forms.

**MATH 470 03(3-0-0). Euclidean and Non-Euclidean Geometry.** S. Prerequisite: MATH 229 or MATH 369; MATH 261.

Topics from real Euclidean, affine metric and non-Euclidean geometries emphasizing methods and connections with other areas of mathematics.

**\*MATH 472 03(3-0-0). Introduction to Topology.** F. Prerequisite: MATH 317.

Topologies on sets, continuous functions, homeomorphisms. Sequences and convergence, metric spaces, Connectedness, path-connectedness. Separation properties. Compactness. Countability axioms.

**\*MATH 474 03(3-0-0). Introduction to Differential Geometry.** S. Prerequisite: MATH 261; MATH 369.

Local and global geometry of curves and surfaces in Euclidean space, curvature, covariant differentiation, geodesics and the Gauss-Bonnet

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theorem.

**MATH 476 03(3-0-0). Topics in Mathematics.** F, S, SS. Prerequisite: Written consent of instructor.

Study experiences which deal with established content areas in mathematics.

**MATH 484 Var [1-3]. Supervised College Teaching.** F, S. Prerequisite: Written consent of instructor. A maximum of 10 combined credits for all 384 and 484 courses are counted towards graduation requirements.

**MATH 487 Var [1-16]. Internship.** Prerequisite: Written consent of instructor.

A work-learn experience integrating classroom theory with practical experience.

**MATH 495 Var. Independent Study.** Prerequisite: Written consent of instructor.

**MATH 498 Var [1-3]. Undergraduate Research in Mathematics.** Prerequisite: Written consent of instructor.

Research skills and techniques taught to suit student's level and interests. Includes both oral and written communication of results.

**MATH 501 03(3-0-0). Combinatorics I.** F. Prerequisite: MATH 301; MATH 360 or MATH 366.

Puzzles, numbers and counting, subsets, recurrence relations, generating functions, inversion, counting with symmetry, networks, matchings.

**MATH 502 03(3-0-0). Combinatorics II.** S. Prerequisite: MATH 501.

Graph algorithms, external set theory; partitions, Hadamard matrices, q-binomials, finite geometries, strongly regular graphs, triple systems, designs.

**MATH 505 03. Teaching Problem Solving in Mathematics K-12.** F, S. Prerequisite: Teacher licensure. Offered as telecourse only.

Problem-solving strategies, cooperative learning, and manipulatives for K-12 classroom. (NT-T)

**MATH 510 03(3-0-0). Linear Programming and Network Flows.** F, S, SS. Prerequisite: MATH 261 or MATH 315. Credit not allowed for both MATH 510 and ENGR 510.

Optimization methods: linear programming, simplex algorithm, duality, sensitivity analysis, minimal cost network flows, transportation problem. (NT-V)

**MATH 517 03(3-0-0). Introduction to Real Analysis.** F. Prerequisite: MATH 417; MATH 369.

Euclidean and metric spaces, compactness, continuity, sequences, series, multivariable differentiation, inverse and implicit function theorems.

**MATH 519 03(3-0-0). Complex Variables I.** S. Prerequisite: MATH 317.

Analytic functions, complex integration theory, singularities, elementary functions, and mappings.

**MATH 520 03(3-0-0). Nonlinear Programming.** S. Prerequisite: MATH 510.

Theoretical, computational, practical aspects of nonlinear programming (NLP); unconstrained, constrained NLP; quadratic programming; large-scale NLP.

**\*MATH 525 03(3-0-0). Optimal Control.** S. Prerequisite: MATH 340 or MATH 345.

Theory and application of optimal control and optimal estimation theory; continuous and discrete time systems; Pontryagin maximum principle.

**MATH 530 04(4-0-0). Mathematics for Scientists and Engineers.** F. Prerequisite: MATH 340 or MATH 345. Not for mathematics graduate students. Credit not allowed for both MATH 530 and MATH 332.

Proof-oriented linear algebra, ordinary and partial differential equations.

**MATH 532 03(3-0-0). Mathematical Modeling of Large Data Sets.** S.

Prerequisite: MATH 369 or MATH 530.

Mathematical theory and algorithms for modeling large data sets. Application to real world problems. Emphasis on geometric ideas.

**MATH 535 03(3-0-0). Foundations of Applied Mathematics.** F. Prerequisite: MATH 340 or MATH 345.

Calculus of variations, perturbation methods, models of continuum, dimensional analysis, stochastic models, integral equations, diffusion.

**MATH 540 03(3-0-0). Dynamical Systems.** F. Prerequisite: MATH 340 or MATH 345 or MATH 530.

Linear and nonlinear systems, orbits, phase space, flows of vector fields, stability, bifurcation theory, chaos, strange attractors and applications.

**MATH 545 03(3-0-0). Partial Differential Equations I.** F. Prerequisite: MATH 340 or MATH 345 or MATH 530.

Second order linear PDEs, elliptic and parabolic equations, equations of math physics, separation of variables, Fourier series.

**MATH 546 03(3-0-0). Partial Differential Equations II.** S. Prerequisite: MATH 545.

Distribution theory, Green's functions, Sobolev spaces, elliptic and parabolic equations.

**MATH 550 03(3-0-0). Intro to Numerical Methods for PDEs.** S. Prerequisite: MATH 340 or MATH 345 or MATH 530.

Finite elements, finite differences, spectral methods, method of lines, conservation laws; stability and convergence analysis for PDEs.

**MATH 560 03(3-0-0). Linear Algebra.** F. Prerequisite: MATH 369.

Finite dimensional vector spaces, inner products, dual spaces, transformations, projections, adjoints, norms, eigenvalues, eigenvectors.

**MATH 561 04(4-0-0). Numerical Analysis I.** S. Prerequisite: CS 156 or CS 160 or CS 253 or MATH 151; MATH 560.

Numerical linear algebra, solving nonlinear systems, least squares, and minimization.

**MATH 566 03(3-0-0). Introduction to Abstract Algebra I.** F. Prerequisite: MATH 366.

Analysis of algebraic structures including groups, rings, fields, and vector spaces.

**MATH 567 03(3-0-0). Introduction to Abstract Algebra II.** S. Prerequisite: MATH 566.

Field theory, Galois theory, and advanced linear algebra.

**\*MATH 570 03(3-0-0). Topology I.** F. Prerequisite: MATH 417 or MATH 472.

Point-set topology including basic set theory, continuity, product and quotient spaces, metrization, compactness, and connectedness.

**\*MATH 571 03(3-0-0). Topology II.** S. Prerequisite: MATH 566; MATH 570.

Fundamental group, free groups and presentations, and manifolds.

**MATH 584 01(1-0-0). Supervised College Teaching.** F, S. Prerequisite: Written consent of instructor.

**MATH 592 01(0-0-1). Seminar in Mathematics.** Prerequisite: Written consent of instructor.

**MATH 601 03(3-0-0). Advanced Combinatorics I.** F. Prerequisite: MATH 502; MATH 566.

Special numbers, mobius inversions, transversals, partial orders, different sets, codes, t-designs.

**MATH 602 03(3-0-0). Advanced Combinatorics II.** S. Prerequisite: MATH 601.

Hypergeometric functions, graph algorithms, hadamard matrices,

\*Alternate year offering (odd); \* Alternate year offering (even); + Field trips; S Special course fee; NT Approved for nontraditional course offering (B = blended, C = correspondence, O = online, T = telecourse, V = videotape/DVD); GT-subcode = State Guarantee Transfer course and AUCCsubcode = All University Core Curriculum, where the subcode refers to the specific category the course fulfills. (See Introduction for more information.)

Date: September 23, 2013  
 To: Tim Gallagher, Chair of Faculty Council  
 From: David Greene, Chair  
 Committee on Responsibilities and Standing of Academic Faculty  
 Subject: Proposed revision to Section F.3.4.1 of the *Manual*

The Committee on Responsibilities and Standing of Academic Faculty

MOVES, THAT Section F.3.4.1 OF THE *ACADEMIC FACULTY AND ADMINISTRATIVE PROFESSIONAL MANUAL* BE REVISED AS FOLLOWS:

Please note the language: additions underlined, deletions ~~overseored~~.

**F.3.4.1 Conditions and Procedures for Granting Sabbatical Leave** (~~Last revised June 22, 2006~~)

- a. The faculty member seeking sabbatical leave shall follow the procedures established by his or her academic unit. College deans or the Dean of Libraries, shall forward to the Provost, the names of faculty members recommended for sabbatical leave along with a detailed sabbatical plan. The detailed plan shall specify how the sabbatical will result in the faculty member's professional growth, enhance the institution's reputation and the students' educational experience at the institution, and increase the overall level of knowledge in the faculty member's area of expertise.
- b. Administrative members of the faculty are not eligible for sabbatical leaves. Department heads shall be eligible for sabbatical leaves.
- c. Absence is to be for not more than two (2) academic semesters in cases of faculty members on nine (9) month appointments, and for not more than one (1) calendar year in cases of faculty on twelve (12) month appointments.
- d. A faculty member may elect to take his or her sabbatical leave in two (2) or more different time periods, instead of all at once, providing that he or she is able to show that this is a more beneficial arrangement for his or her professional development and for the needs of his or her department. The total of such time periods with full pay shall not exceed one-half (0.5) of the term of his or her annual appointment, whether it be nine (9) or twelve (12) months, and each grant of such total time for leave shall be made only after six (6) years of previous full-time employment.
- e. The salary of a faculty member while on sabbatical leave shall be either one-half (0.5) his or her base salary for one (1) year nine (9) or twelve (12) month appointments) or full salary for one (1) semester for nine (9) month employees or full salary for six (6) months for twelve (12) month employees (except as provided in item "j" listed below). The base salary shall be the salary scheduled for the year of the semester in which the leave is taken. A faculty member who participates in PERA and is on half-pay (0.5) will receive service credit towards PERA to the extent provided for in PERA's statutes and policies. A faculty member who participates in the Defined Contribution Plan (DCP) will receive continued contributions during sabbatical leave in accordance with the DCP plan description. Faculty members on sabbatical leave are eligible for all benefits.
- f. As a prior condition to the granting of sabbatical leave, the faculty member must agree in writing that upon expiration of leave he or she will return to his or her employment with the University for at least



one (1) year (two (2) semesters for nine (9) month employees), and, if the individual fails to conform to the requirement, he or she will refund to the Board in full the salary and such other fringe benefits the University has paid in the individual's behalf during his or her leave as a prior condition of his or her release from the agreement.

g. Absence must be planned to permit conduct of work of the department or section with least inconvenience and least additional expense during the faculty member's absence. If more than one (1) member from the same department or section desires leave at the same time and absence of two (2) members would constitute a hardship to the department or section, either by handicapping the work or by causing too great additional expense, priority for leave shall be given to the faculty member longest employed by the University on a continuous regular appointment since any such type of leave.

h. The accumulation of service for sabbatical leave is limited to six (6) years. Periods of temporary employment do not count toward the accumulation for service for sabbatical leave.

i. During sabbatical leave, faculty members are permitted to accept part-time employment from an employer other than Colorado State University when that employment is directly related to objectives of their leave. There is no limit on the amount of remuneration which may be received for such employment. Any part-time employment of a faculty member on leave shall be in the professional field of work of the faculty member and shall be approved by the department head, dean, and Provost prior to the leave.

j. With the approval of the Office of Sponsored Programs, faculty members on sabbatical leaves are permitted to accept additional salary compensation from grants and/or contracts administered by Colorado State University, as long as the total compensation from all University sources, including contracts and grants, does not exceed the full-time base salary during the period of their sabbatical leave. This additional salary, including cost of fringe benefits, must be fully funded by the grants and/or contracts.

~~k. Faculty members on sabbatical leave cannot receive supplemental pay for duties performed for Colorado State University.~~

~~lk.~~ Sabbatical leave is not granted for the purpose of taking substantially full-time employment in another assignment regardless of how closely related such employment may be to the technical field of the faculty member. Special leave without pay is intended to be used in such cases. This limitation does not extend to employment as faculty assistant or fellows or the equivalent by faculty members whose sabbatical leave is authorized for the purpose of study toward a higher degree.

~~ml.~~ Requests for sabbatical leaves to commence within any fiscal year shall be submitted in the preceding fiscal year through the department head and dean to the Office of the Provost. The submission deadline shall allow faculty members at least thirty (30) days following the beginning of the fall appointment period to prepare their requests. The submission deadline may be extended when there are extenuating circumstances.

~~nm.~~ Normally, time spent on leave does not count toward the accumulation of service for sabbatical leave. However, in special cases, time spent on non-sabbatical leave may count toward the accumulation

of service for sabbatical leave. This requires that the details and rationale regarding the accumulation of service be stated in writing in the request for non-sabbatical leave, and that they be approved in writing by the Provost prior to the beginning of the non-sabbatical leave.

en. The faculty member on sabbatical leave is on University business, and shall be eligible for promotion and salary raises while on leave.

po. Sabbatical leaves may be spent at any location.

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Rationale: The issue of supplemental pay during sabbatical should be handled at the department level.

Date: September 23, 2013  
 To: Tim Gallagher, Chair of Faculty Council  
 From: David Greene, Chair  
 Committee on Responsibilities and Standing of Academic Faculty  
 Subject: Proposed revision to Section 1.7 of the *Manual*

The Committee on Responsibilities and Standing of Academic Faculty

MOVES, THAT Section 1.7 OF THE *ACADEMIC FACULTY AND ADMINISTRATIVE PROFESSIONAL MANUAL* BE REVISED AS FOLLOWS:

Please note the language: additions underlined, deletions ~~overseered~~.

**I.7 Student Appeals of Grading Decisions** *(last revised June 23, 2010)*

Course instructors (see footnote #1) are responsible for stating clearly the instructional objectives  
 . . . *(no changes)*

. . . Before making an appeal, the student should discuss the situation with the course instructor(s) involved in the decision. *(no changes)*

To appeal a grading decision, the student shall submit a written request to the department head. The request must set forth the basis for the appeal, identifying one (1) or more of the three (3) criteria listed above. The request must be submitted (or postmarked, if mailed) no later than thirty (30) calendar days after the first day of classes of the following spring semester for appeal of grades recorded for the fall, or after the first day of classes of the following fall semester for grades received in the spring or summer semester. ~~next regular semester following the date the grade was recorded.~~ If no appeal is filed within this time period, the grade shall be considered final.

Within thirty (30) calendar days of the receipt of an appeal, the department head shall forward the appeal ~~shall be forwarded~~ to the course instructor(s) who assigned the grade and an appeal committee shall be formed, ~~unless~~ If the request is received during or shortly before the Summer Session, when the course instructor(s) who assigned the grade or members of the appeal committee ~~will~~ may not be available, ~~in which case,~~ the appeal committee shall be formed no later than thirty (30) calendar days after the beginning of the following Fall semester. The appeal committee shall be composed of two (2) faculty members and two (2) students from within the department and one (1) faculty member from outside the department who shall serve as the chair. All five (5) members of the appeal committee shall be voting members. The procedure for the selection of the members of the appeal committee shall be specified in the Department Code.

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Rationale: These changes allow for responsive action in the semester immediately following the grade assignment in the case that the faculty member or Disciplinary Panel members are available in the summer term, and the procedure to follow if not.

# ACADEMIC CALENDAR

## FALL SEMESTER 2018 THROUGH SUMMER 2020

### Fall Semester 2018

Aug. 16-17	Thursday-Friday	Orientation
Aug. 20	Monday	Classes Begin
Aug. 24	Friday	End Restricted Drop
Aug. 26	Sunday	End Regular Add
Sept. 3	Monday	Holiday - University Offices Closed - No Classes
Sept. 5	Wednesday	Registration Closes – last day for dropping courses without record entry, changes in grade option, and tuition and fee adjustment
Oct. 15	Monday	End Course Withdrawal (“W”) Period
Nov. 17	Saturday	Fall Recess Begins, No Classes Next Week
Nov. 22-23	Thursday-Friday	Holiday – University Offices Closed - No Classes
Nov. 26	Monday	Classes Resume
Dec. 7	Friday	Last Day of Classes; University Withdrawal Deadline
Dec. 10-14	Monday-Friday	Final Examinations
Dec. 14-15	Friday-Saturday	Commencement
Dec. 18	Tuesday	Grades Due
Dec. 24-26	Monday-Wednesday	Holiday – University Offices Closed
(79 Days, Including Final Examinations)		

### Spring Semester 2019

Jan. 1	Tuesday	Holiday – University Offices Closed
Jan. 17-18	Thursday-Friday	Orientation, Advising and Registration for New Students
Jan. 21	Monday	Holiday – University Offices Closed
Jan. 22	Tuesday	Classes Begin
Jan. 25	Friday	End Restricted Drop
Jan. 27	Sunday	End Regular Add
Feb. 6	Wednesday	Registration Closes –last day for dropping courses without record entry, changes in grade option, and tuition and fee adjustment
Mar. 16	Saturday	Spring Break Begins – No Classes Next Week
Mar. 25	Monday	End Course Withdrawal (“W”) Period
Mar. 25	Monday	Classes Resume
May 10	Friday	Last Day of Classes; University Withdrawal Deadline
May 13-17	Monday-Friday	Final Examinations
May 16-18	Thursday-Saturday	Commencement
May 21	Tuesday	Grades Due
(79 Days, Including Final Examinations)		

**Summer Session 2019**

May 20	Monday	1st 4 Week and 12 Week Term Begins
May 27	Monday	Holiday University Offices Closed - No Classes
Jun. 14	Friday	1 <sup>st</sup> 4 Week Term Ends
Jun. 17	Monday	2 <sup>nd</sup> 4 Week Term and 8 Week Terms Begin
Jun. 26	Wednesday	Census
Jul. 4	Thursday	Holiday – University Offices Closed - No Classes
Jul. 12	Friday	2 <sup>nd</sup> 4 Week Term Ends
Jul. 15	Monday	3 <sup>rd</sup> 4 Week Term Begins
Aug. 9	Friday	8, 12 and 3 <sup>rd</sup> 4 Week Terms End
Aug. 13	Tuesday	Grades Due

**SUMMER WITHDRAWAL PERIOD:** Because Summer classes have different time periods, the last day a student can withdraw from a course with “W” entered on the record is ten days into the session for a four-week course, 20 days into the session for an eight week course, and 30 days into the session for a 12 week course. If there are any questions, please consult the Registrar’s office.

**Fall Semester 2019**

Aug. 22-23	Thursday-Friday	Orientation
Aug. 26	Monday	Classes Begin
Aug. 30	Friday	End Restricted Drop
Sept. 1	Sunday	End Regular Add
Sept. 2	Monday	Holiday - University Offices Closed - No Classes
Sept. 11	Wednesday	Registration Closes –last day for dropping courses without record entry, changes in grade option, and tuition and fee adjustment
Oct. 21	Monday	End Course Withdrawal (“W”) Period
Nov. 23	Saturday	Fall Recess Begins, No Classes Next Week
Nov. 28-29	Thursday-Friday	Holiday – University Offices Closed
Dec. 2	Monday	Classes Resume
Dec. 13	Friday	Last Day of Classes; University Withdrawal Deadline
Dec. 16-20	Monday-Friday	Final Examinations
Dec. 20-21	Friday-Saturday	Commencement
Dec. 23	Monday	Grades Due
Dec. 25-27	Wed-Fri	Holiday – University Offices Closed
(79 Days, Including Final Examinations)		

**Spring Semester 2020**

Jan. 1	Wednesday	Holiday – University Offices Closed
Jan. 16-17	Thursday-Friday	Orientation, Advising & Registration for New Students
Jan. 20	Monday	Holiday – University Offices Closed
Jan. 21	Tuesday	Classes Begin
Jan. 24	Friday	End Restricted Drop, Special B*
Jan. 26	Sunday	End Regular Add
Feb. 5	Wednesday	Registration Closes – last day for dropping courses without record entry, changes in grade option, and tuition and fee adjustment
Mar. 14	Saturday	Spring Break Begins – No Classes Next Week
Mar. 23	Monday	End Course Withdrawal (“W”) Period
Mar. 23	Monday	Classes Resume
May 8	Friday	Last Day of Classes; University Withdrawal Deadline
May 11-15	Monday-Friday	Final Examinations
May 14-16	Thursday-Saturday	Commencement
May 19	Tuesday	Grades Due
(79 Days, Including Final Examinations)		

**Summer Session 2020**

May 18	Monday	1st 4 Week and 12 Week Term Begins
May 25	Monday	Holiday - University Offices Closed - No Classes
Jun. 12	Friday	1 <sup>st</sup> 4 Week Term Ends
Jun. 15	Monday	2 <sup>nd</sup> 4 Week Term and 8 Week Terms Begin
Jun. 24	Wednesday	Census
Jul. 3	Friday	Holiday – University Offices Closed - No Classes
Jul. 10	Friday	2 <sup>nd</sup> 4 Week Term Ends
Jul. 13	Monday	3 <sup>rd</sup> 4 Week Term Begins
Aug. 7	Friday	8, 12 and 3 <sup>rd</sup> 4 Week Terms End
Aug. 11	Tuesday	Grades Due

**SUMMER WITHDRAWAL PERIOD:** Because Summer classes have different time periods, the last day a student can withdraw from a course with “W” entered on the record is 10 days into the session for a four week course, 20 days into the session for an eight-week course, 30 days into the session for a 12-week course. If there are any questions, please consult the Registrar’s office.

Additions are underlined, and deletions are indicated by ~~strikeouts~~.

*C.2.1.3.2 Ex Officio Members (last revised June 23, 2010)*

~~Persons who are not members of Faculty Council but are~~ Chairpersons of its Faculty Council standing committees, serving as the official representatives of the standing committees to Faculty Council, shall be *ex officio* voting members of Faculty Council. Persons who are not members of Faculty Council, but are chairpersons of its advisory committees, shall be *ex officio* non-voting members of Faculty Council.

The immediate past Chairperson of Faculty Council shall be an *ex officio* non-voting member of the Faculty Council for one (1) year immediately following the expiration of his or her term as Chairperson of the Faculty Council.

The President of the University, the Provost, the Vice Presidents, the Vice Provosts, the Deans of the Colleges and the Libraries, and the Chair of the Administrative Professional Council shall be seated on the Faculty Council as *ex officio* non-voting members.

*C.2.1.9.3 Membership and Organization (last revised June 23, 2010)*

The membership of each standing committee or advisory committee is specified to fit the functions of that committee. Administrators, administrative professionals, classified staff, undergraduate student members representing the Associated Students of Colorado State University (ASCSU), and graduate student members representing the University Graduate Student Council shall be authorized for certain standing committees and advisory committees. Faculty membership on advisory committees shall be limited to faculty members who do not hold an administrative appointment of more than half-time (0.5) at the level of assistant/associate dean or above. Faculty membership on standing committees shall be limited to regular full-time, regular part-time, and transitional faculty members who do not hold an administrative appointment of more than half-time (0.5) at the level of assistant/associate dean or above. A member of a standing committee or advisory committee who becomes ineligible shall cease to hold this position.

Each standing committee or advisory committee shall have a chairperson whose term of office is twelve (12) months beginning July 1. ~~Standing committee chairpersons must meet the requirements for elected membership of Faculty Council as specified in Section C.2.1.3.1, but need not be elected members of Faculty Council. This restriction shall not apply to advisory committee chairpersons.~~ Each standing committee or advisory committee chairperson shall be elected by and from the membership of that committee. After members of standing committees and advisory committees are elected, as specified in Section C.2.1.9.4, the continuing and newly elected members of each standing committee or advisory committee, other than the Executive Committee, shall meet and elect a committee chairperson for the coming term before May 15. The committee members who are being replaced may attend this meeting, and they may speak, but they shall not cast votes for the new chairperson. However, if a newly elected committee member is unable to attend the meeting, then he or she may allow the committee member that he or she is replacing to cast a vote for the chairperson in his or her place.

Membership on standing committees and advisory committees of the Faculty Council shall be spread as widely as possible among faculty members so that newer members of the faculty may serve on these committees. Standing committee and advisory committee leadership shall be rotated as good judgment allows.

Standing committees and advisory committees are expected to consult regularly with those administrators, members of the faculty, or others who can provide information necessary for effective deliberation. Each standing committee or advisory committee may name *ex officio* or associate members who are expected to attend committee meetings regularly. The appointments shall be reviewed by the standing committee or advisory committee annually. Each standing committee or advisory committee shall identify in its annual report to the Faculty Council its *ex officio* and



associate members and others with whom it has regularly conferred. All *ex officio* and associate members shall be non-voting.

Standing committees and advisory committees shall convene subcommittees as needed to consider specific issues or perform specific tasks. These subcommittees shall exist to serve the standing committees and advisory committees. A subcommittee of a standing committee or advisory committee shall be chaired by a member of that committee, but may draw other members from throughout the University as appropriate.

The Chairperson of the Executive Committee shall be an *ex officio*, non-voting member of each standing committee and advisory committee of the Faculty Council.

Unless otherwise specified in the committee's operating procedures, for transacting business at standing committee and advisory committee meetings, a quorum is defined as a simple majority of the voting members.

~~In the event that a standing committee member who is not a member of Faculty Council is~~ The elected chairperson of the standing committee, ~~this individual~~ shall serve as an *ex officio* voting member of the Faculty Council for the duration of his or her term as chairperson. ~~The chairperson may designate a committee member to substitute as~~ *ex officio* voting member provided prior notice is given to the Chairperson of Faculty Council. In the event that an advisory committee member who is not a member of Faculty Council is elected chairperson of the advisory committee, this individual shall serve as an *ex officio* non-voting member of the Faculty Council for the duration of his or her term as chairperson.

Rationale: In confirming the principle that voting privilege is extended to the Faculty Council standing committees, and not particular individuals in the committees, this will allow standing committees to elect the best possible leadership under increasingly diverse membership and for standing committee Chairs to designate substitutes for Faculty Council meetings.

Faculty Council carries an umbrella of responsibilities extending past regular faculty because of its stewardship of the Academic Faculty and Administrative Professional Manual. Moreover, the increasing reliance of the University on non-tenure track faculty to fulfill its Mission has created an implicit responsibility for issues involving non-tenure track faculty that impinge on regular faculty responsibilities and rights, especially in its standing committees. A major function of standing committees is to bring motions to Faculty Council for consideration. This extended responsibility has caused significant tension in the past because of the perception that the extended communities are not well represented in Faculty council and its standing committees.

These facts are recognized for example in the composition of the Committee on Strategic and Financial Planning, and the recent motion to change the University Committee on Benefits into a Faculty Council standing committee. It can be reasonably anticipated that other standing committees will move to formally include administrative professionals and non-tenure track faculty in their memberships.

The standing committees serve a critical role in the Faculty Council deliberative process. It is essential that each committee have the capacity to elect the best possible leadership from its members.

The proposed changes to the AFAPM would confirm that each standing committee is afforded the privilege of voting in Faculty Council and that privilege can be executed by the chairs of the standing committees or their designated substitute from the committee membership, whether or not the chair or the designated representative is a regular (full or part time) faculty member.

## MEMORANDUM

DATE: April 24, 2013

TO: Tim Gallagher, Chair, Faculty Council

FROM: Don Estep, Chair, Committee on Faculty Governance

SUBJECT: Proposed Revisions to the *Manual, University Code*, Section C.2.1.9.5.d - Committee on Libraries

The Committee on Faculty Governance moves that the Faculty Council adopt the proposed revisions to the *Manual University Code*, Section C.2.1.9.5.d – Committee on Libraries to be effective upon approval by the Board of Governors of the Colorado State University System as follows:

Additions - underlined - Deletions - ~~strikeouts~~

C.2.1.9.5 *Standing Committees: Membership and Function*

d. *Committee on Libraries*

The Committee on Libraries shall consist of one (1) faculty member from each college, and the Libraries, the Dean of Libraries (*ex officio*), one (1) graduate student, and one (1) undergraduate student. The duties of this standing committee shall be:

1. To recommend to the Faculty Council policies ~~governing the operation of affecting or impacting~~ the Libraries.
- ~~2. To advise the Dean of Libraries in the execution of policy whenever such execution shall have a significant impact upon the services provided by the Libraries.~~
- ~~3. To recommend to the Dean of Libraries the allocation of funds for library acquisitions.~~
- ~~4. To advise the Committee on Strategic and Financial Planning of the Library's budgetary requirements.~~
2. To advise the Committee on Strategic and Financial Planning of the Library's budgetary and service requirements.
3. To advise the Dean of Libraries:
  - a. On strategies and policies for services and collections;
  - b. On the allocation of funds to support Library services; and
  - c. On the needs of its patrons (students, faculty, staff, community at large.)

**Rationale:** According to the Committee on Libraries these revisions better explain the role of this committee and especially its relationship to the Dean of Libraries.

## MEMORANDUM

DATE: May 14, 2013

TO: Committee on Faculty Governance  
Don Estep, Chair

FROM: University Curriculum Committee  
Howard Ramsdell, Chair

SUBJECT: Proposed Revisions to the *Manual*, University Code, Section C.2.3.1.e – Colleges and Academic Departments – College of Liberal Arts

The Committee on Faculty Governance submits the following motion:

MOVED, THAT FACULTY COUNCIL ADOPT THE PROPOSED REVISIONS TO THE *MANUAL*, UNIVERSITY CODE, SECTION C.2.3.1.e – COLLEGES AND ACADEMIC DEPARTMENTS – COLLEGE OF LIBERAL ARTS TO BE EFFECTIVE JULY 1, 2014 AND UPON APPROVAL BY THE BOARD OF GOVERNORS OF THE COLORADO STATE UNIVERSITY SYSTEM AS FOLLOWS:

Additions are underlined, and deletions are indicated by ~~strikeouts~~.

C.2.3.1 – Colleges and Academic Departments

e. College of Liberal Arts (*last revised June 4, 2008*)

Comprising the Departments of Anthropology; ~~Art~~ Art and Art History; Communication Studies; Economics; English; Ethnic Studies; Foreign Languages and Literatures; History; Journalism and Technical Communication; Music, Theater, and Dance; Philosophy; Political Science; and Sociology.

Rationale: The proposed name would more accurately reflect the academic strengths of the undergraduate and graduate degrees offered in the department, given the emphasis on art historical training for studio students (B.F.A., B.A., and M.F.A.) and the emphasis on studio training for art history students (B.A.) as reflected in the number of credits required for completion of degree work in each area. The proposed name is more inclusive and would bring the department into alignment with other departments across the country that offer degrees in studio art and art history; most departments of this nature include art history in the title of the department. Changing the name would have the added benefit for recruitment of making prospective students aware of the full range of opportunities for study in the visual arts, including art history, and thereby entice more potential applicants to choose Colorado State University for studies in art and art history. Furthermore, the proposed name would bolster the external perception of the department's relationship to the University Art Museum, with the benefit of communicating to potential museum donors the integral role art history plays in fostering a place for research in the visual arts at the university. The name change would also benefit faculty grant-writing efforts by signaling to granting agencies the equal standing of art history, studio art and art education within the department. This name change would also lay the groundwork for the possibility of planning a Masters in Art History in the coming years.

This proposal was approved by the University Curriculum Committee on March 29, 2013.