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## Curriculum Subcommittee Agenda, April 7, 2016

Utah State University

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**Curriculum Subcommittee Agenda**  
**7 April 2016**

A meeting of the Curriculum Subcommittee of the Educational Policies Committee will be held on 7 April 2016 at 2:00 pm in Old Main 136 (Champ Hall Conference Room).

1. *Approval of 3 March 2016*  
<https://usu.box.com/s/cwjtc8ay50a6opdsej23gvyyren4tey>
2. *Semester Course Approval Reviews*  
<https://usu.curriculog.com/>

***College of Agriculture and Applied Sciences***

ADVS = 2  
APEC = 4  
ASTE = 20  
LAEP = 4  
NDFS = 6  
PSC =

***Caine College of the Arts***

ART =  
MUSC = 1  
THEA =

***Jon M. Huntsman School of Business***

ACCT =  
BUS =  
ECN =  
MGT =  
MIS =

***Emma Eccles Jones College of Education and Human Services***

COMD =  
EDUC =  
FCHD = 8  
HPER = 1  
ITLS =  
NURS =  
PSY = 2  
SPED =  
TEAL = 2

***College of Engineering***

BENG = 5  
CEE =  
CS = 3  
ECE = 4  
EED =  
MAE = 2

*College of Humanities and Social Sciences*

ENGL = 6  
HIST = 4  
JCOM = 7  
LPCS = 5  
POLS = 1  
SSWA =

*S.J. & Jessie E. Quinney College of Natural Resources*

ENVS = 4  
WATS = 4  
WILD = 8

*College of Science*

BIOL = 6  
CHEM =  
GEOL = 4  
MATH =  
PHYS =

USU =

**1. ADVS - 5500 - Applied Animal Nutrition**

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**2. ADVS - 6500 - Applied Animal Nutrition**

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**3. APEC - 1600 - Natural Resources and American Economic Institutions**

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**4. APEC - 4900 - Directed Readings, Research, or Seminar Series**

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**5. APEC - 6910 - Independent Research**

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**6. ASTE - 3100 - Personal and Team Leadership**

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**7. AV - 1130 - Principles of Flight**

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**8. AV - 2160 - Aircraft Systems for the Professional Pilot**

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**9. AV - 2410 - Commercial Stage I Flight**

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**10. AV - 2500 - Flight Experience**

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**11. AV - 2501 - AV 2501 Flight Experience**

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**12. AV - 2502 - Flight Experience**

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**13. AV - 2503 - Flight Experience**

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**14. AV - 2504 - Flight Experience**

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**15. AV - 2505 - Flight Experience**

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16. AV - 4710 - Crew Resource Management

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17. AV - 5500 - Airline Transport Pilot (ATP) Ground School

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18. AV - 6110 - Air Transportation

---

19. AV - 6130 - Aerospace Technology and Automation

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20. AV - 6140 - Aviation Safety: History and Research

---

21. AV - 6330 - Flight Safety Program Management

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22. AV - 6340 - Aircraft Accident Investigation and Analysis

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23. AV - 6350 - Aviation Security

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24. AV - 6900 - Aviation Independent Study

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25. AV - 6930 - Aviation Special Topics

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26. BENG - 4880 - Biological Engineering Design II

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27. BENG - 6860 - Research Orientation and Planning ✖

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28. BENG - 6870 - Research Planning ✖

---

29. BENG - 7860 - Research Orientation and Planning ✖

---

30. BENG - 7870 - Research Planning ✖

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31. BIOL - 1610 - Biology I

---

32. BIOL - 1615 - Biology I Laboratory

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33. BIOL - 1620 - Biology II (BLS)

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34. BIOL - 1625 - Biology II Laboratory

---

35. BIOL - 4060 - Exploring Animal Behavior (CI)

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36. BIOL - 5250 - Evolutionary Biology (CI)

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37. CS - 2810 - Computer Systems Organization and Architecture

---

38. CS - 6675 - Advanced Data Science and Mining ✖

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39. CS - 7675 - Advanced Data Science and Mining ✖

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40. ECE - 5760 - Hardware and Embedded Systems Security ✖

---

41. ECE - 6340 - Spacecraft Attitude Control Theory ✖

---

42. ECE - 6345 - Spacecraft Attitude Control Applications ✖

---

43. ECE - 6760 - Hardware and Embedded Systems Security ✖

---

44. ENGL - 3710 - TOPICS IN FOLKLORE ✖

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45. ENGL - 4220 - Teaching Literacy in Diverse Classrooms

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46. ENGL - 4340 - Studies in Prose

---

47. ENGL - 4530 - English Clinical Experience

---

48. ENGL - 5300 - Special Topics in Literary Studies (CI)

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49. ENGL - 5310 - Contemporary Literature

---

50. ENVS - 2220 - General Ecology

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51. ENVS - 4920 - Special Projects in Recreation Management

---

52. ENVS - 6830 - Graduate Student Publishing Seminar ✖

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53. ESOL - 2410 - Comprehending Lecture Discourse

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54. ESOL - 2420 - Writing from Academic Sources

---

55. ESOL - 2440 - Academic Discourse

---

56. ESOL - 2460 - Reading from Academic Sources

---

57. ESOL - 2470 - Cross-Cultural Perspectives

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58. FCHD - 3310 - Consumer Policy

---

59. FCHD - 3510 - Infancy and Early Childhood

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60. FCHD - 3520 - Children in the Middle Years

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61. FCHD - 3530 - Adolescence

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62. FCHD - 4240 - Social and Family Gerontology

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63. FCHD - 4820 - Methods for Family Life Educators

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64. FCHD - 4830 - Senior Capstone Project

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65. FCHD - 4950 - Practicum: Consumer Science

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66. GEO - 1360 - Planet Earth

- 
67. GEO - 1380 - Where Science and Society Meet
- 
68. GEO - 5420 - Ore Deposits ✚
- 
69. GEO - 6420 - Ore Deposits ✚
- 
70. HIST - 3330 - Modern Russia and the Soviet Experience
- 
71. HIST - 4566 - Modern Islamic Thought ✚
- 
72. IOGP - 5930 - State and Local Government Internship
- 
73. JCOM - 1130 - News Writing
- 
74. JCOM - 2180 - Beginning Photojournalism
- 
75. JCOM - 3100 - Reporting Public Affairs (CI)
- 
76. JCOM - 3320 - Strategic Research Methods in Public Relations (DSS)
- 
77. JCOM - 4030 - Mass Media Law (DSS)
- 
78. JCOM - 4150 - Advanced Digital Photojournalism
- 
79. JCOM - 6430 - Mass Media Law
- 
80. LAEP - 2720 - Site Planning and Design
- 
81. LAEP - 4110 - Landscape Construction II
- 
82. LAEP - 4910 - Professional Communication and Leadership
- 
83. LAEP - 6160 - Professional Communication and Leadership
- 
84. MAE - 6340 - Spacecraft Attitude Control Theory ✚
- 
85. MAE - 6345 - Spacecraft Attitude Control Applications ✚
- 
86. MUSC - 2210 - Advanced Conducting Ensemble
- 
87. NDFS - 3600 - Medical Terminology for Health Care Professionals
- 
88. NDFS - 4990 -
- 
89. NDFS - 5210 - Advanced Public Health Nutrition
- 
90. NDFS - 6640 - Food Proteins & Enzymes
- 
91. NDFS - 6700 - Dairy Chemistry
- 
92. NDFS - 6790 - Current Issues in Dietetics
-

93.  
NEPA - 6230 - Risk Communication for NEPA Specialists: Strategies and Implementation

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94. PE - 4010 - Yoga Theory ✨

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95. POLS - 3260 - Politics and Society in Post-Colonial States ✨

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96. PSY - 3450 - Sensation and Perception

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97. PSY - 3460 - Neuroscience I

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98. RELS - 4566 - MODERN ISLAMIC THOUGHT ✨

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99. RELS - 4566 - Modern Islamic Thought ✨

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100. TEAL - 6340 - Integrating Literacy Across the Curriculum

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101. TEAL - 6785 - Instructional Practices for English Learners

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102. WATS - 2000 - Natural Resources Professional Orientation ✨

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103. WATS - 2220 - General Ecology ✨

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104. WATS - 5640 - Riparian Ecology and Management

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105. WATS - 7640 - Riparian Ecology and Management

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106. WILD - 3300 - Management Aspects of Wildlife Behavior (CI)

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107. WILD - 3800 - Wildland Plants and Ecosystems

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108. WILD - 3810 - Plant and Animal Populations

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109. WILD - 4600 - Conservation Biology

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110. WILD - 4700 - Ecological Foundations of Restoration

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111.  
WILD - 4750 - Monitoring and Assessment in Natural Resource and Environmental Management

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112. WILD - 5560 - Applied Avian Ecology

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113. WILD - 6560 - Applied Avian Ecology

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3. ***Program Proposals***

<https://usu.box.com/s/cwjtcc8ay50a6opdsej23gvyyren4tey>

Request from the Department of English in the College of Humanities and Social Sciences to offer an English Teaching Composite Baccalaureate degree.

Request from the Department of Plants, Soils and Climate in the College of Agriculture and Applied Sciences to offer a Bachelor of Science degree in Climate Science.

4. ***Other Business***

Syllabus task force update

Election of AY 2016-2017 Curriculum Chair.



## CURRICULUM SUBCOMMITTEE MINUTES

3 March 2016

A meeting of the Curriculum Subcommittee of the Educational Policies Committee was held on 3 March 2016 at 2:00 pm in Old Main 136 (Champ Hall Conference Room).

Present: Brian Warnick for Ed Reeve, Chair, College of Agriculture and Applied Sciences  
Larry Smith, Chair, EPC  
Barbara Williams for Michele Hillard, Secretary  
Erin Brewer, Graduate Council  
Richard Mueller, College of Science  
Dawn Kirby, College of Humanities and Social Sciences  
Karen Mock, S.J. & Jessie E. Quinney College of Natural Resources  
Jessica Hansen, Academic and Instructional Services  
Kacy Lundstrom, Libraries  
Dean Adams, College of Engineering  
Scott Henrie, USU-Eastern  
Roland Squire, Registrar's Office  
Scott Hunsaker, Emma Eccles Jones College of Education and Human Services  
Nathan Straight, Regional Campuses

Absent: Scott Bates, Chair, Academic Standards  
Ty Aller, Graduate Studies Senator  
Nicholas Morrison, Caine College of the Arts  
Janet Anderson, Office of the Provost  
Marci Smith, Registrar's Office  
Vijay Kannan, Jon M. Huntsman School of Business

Visitors: N/A

1. *Approval of 4 February 2016 Minutes*  
<https://usu.box.com/s/3mhw17t2dt102rnv4razhhq8v0bg0heg>  
*Motion to approve the Curriculum minutes of 4 February 2016 made by Dean Adams. Minutes approved.*

2. *Semester Course Approval Reviews*  
<https://usu.curriculog.com/>

### ***College of Agriculture and Applied Sciences***

*Motion to approve the business of the College of Agriculture and Applied Sciences made by Brian Warnick. Seconded by Dick Mueller. Business approved.*

ADVS =

APEC =

ASTE = 1

LAEP =

NDFS =

PSC = 1

***Caine College of the Arts***

*Motion to approve the business of the Caine College of the Arts made by Dick Mueller. Seconded by Erin Brewer. Business approved.*

ART = 5

MUSC = 2

THEA = 1

***Jon M. Huntsman School of Business***

*Motion to approve the business of the Jon M. Huntsman School of Business made by Dawn Kirby. Seconded by Dean Adams. Business approved.*

ACCT =

BUS =

ECN = 1

MGT = 1

MIS =

***Emma Eccles Jones College of Education and Human Services***

*Motion to approve the business of the Emma Eccles Jones College of Education and Human Services made by Dean Adams. Seconded by Dick Mueller. Business approved pending PSY revision.*

COMD = 2

EDUC =

FCHD = 3

HPER =

ITLS = 1

NURS = 1

PSY = 1 (PSY 6820 course description needs to state something about the Graduate class requires additional work)

SPED =

TEAL = 1

***College of Engineering***

*Motion to approve the business of the College of Engineering made by Dean Adams. Seconded by Dick Mueller. Business approved.*

BENG =

CEE =

CS = 8

ECE = 1

EED =

MAE = 1

***College of Humanities and Social Sciences***

*Motion to approve the business of the College of Humanities and Social Sciences made by Dawn Kirby. Seconded by Dick Mueller. Business approved.*

ENGL = 4

HIST = 5

JCOM =

LPCS = 4

POLS =

SSWA =

***S.J. & Jessie E. Quinney College of Natural Resources***

*Motion to approve the business of the S.J. & Jessie E. Quinney College of Natural Resources made by Karen Mock. Seconded by Dawn Kirby. Business approved.*

ENVS =

WATS = 1

WILD =

***College of Science***

*Motion to approve the business of the College of Science made by Dick Mueller. Seconded by Brian Warnick. Business approved.*

BIOL = 1

CHEM =

GEOL = 1

MATH =

PHYS = 2

USU =

**1. ART - 3420 - Hashimoto Communication Arts Seminar**

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**2. ART - 4470 - Special Topics in Graphic Design I**

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**3. ART - 4475 - Special Topics in Graphic Design II**

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**4. ARTH - 3780 - 19th Century European Art**

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**5. ARTH - 4520 - The Visual Cultures of Empire (CI)**

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**6. BIOL - 6325 - Bayesian Analysis of Biological Data**

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**7.**

**CLAS - 3170 - Descent and Return: Ancient Views of Hades and the Afterlife**



**8. CMST - 3250 - Organizational Communication**

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**9. COMD - 7450 - COUNSELING FOR COMMUNICATIVE DISORDERS I**

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**10. COMD - 7470 - COUNSELING FOR COMMUNICATIVE DISORDERS II**

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**11. CS - 1440 - Methods in Computer Science**

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**12. CS - 5665 - Introduction to Data Science**

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**13. CS - 5700 - Object-Oriented Software Development**

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14. CS - 6050 - Computational Geometry: Algorithms and Applications ✖
- 
15. CS - 6810 - Wavelets and Wavelet Algorithms ✖
- 
16. CS - 6820 - Speech and Language Processing ✖
- 
17. CS - 7050 - Computational Geometry: Algorithms and Applications ✖
- 
18. CS - 7810 - Wavelets and Wavelet Algorithms ✖
- 
19. ECE - 7340 - Advanced Aerospace Controls ✖
- 
20. ENGL - 3470 - Approaches to Research in English Studies
- 
21. ENGL - 3500 - Literacy, Community, and Service Learning
- 
22. ENGL - 4340 - Studies in Fiction/Nonfiction
- 
23. ENGL - 4540 - Teaching Creative Writing
- 
24.  
FCHD - 1100 - Critical Issues in Family, Consumer, and Human Development
- 
25. FCHD - 2620 - Planning Creative Experiences for Young Children
- 
26. FCHD - 3280 - Economic Issues for Individuals and Families
- 
27. FIN - 5440 - Cases in Finance
- 
28. GEO - 3700 - Structural Geology
- 
29.  
HIST - 3170 - Descent and Return: Ancient Views of Hades and the Afterlife ✖
- 
30. ITLS - 5500 - Integration and Innovation of Technology in Education
- 
31. MAE - 7340 - Advanced Aerospace Controls ✖
- 
32. MGT - 6720 - Strategic Supply Chain Management
- 
33. MUSC - 3515 - Orchestral Auditions Seminar
- 
34. MUSC - 3530 - Cache Symphony Orchestra
- 
35. NURS - 1018 - Professional Nursing

36. PHIL - 1320 - The Good Life

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37. PHIL - 3800 - Philosophy in Literature

---

38. PHIL - 4250 - Tolkien and Lewis on Myth and Truth

---

39. PHYS - 2310 - Physics for Physics Majors I

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40. PHYS - 2320 - Physics for Physics Majors II

---

41. PSC - 3250 - Aviation Weather

---

42. PSY - 6280 - Organizational Behavior Management ✂

---

43.

RELS - 3170 - Descent and Return: Ancient Views of Hades and the Afterlife



44. RELS - 3990 - Theory and Method in Religious Studies

---

45. RELS - 4010 - Yoga Theory ✂

---

46. SCED - 3100 - Motivation and Classroom Management

---

47. TEE - 6960 - Master' Project

---

48.

THEA - 4020 - Acting X-Modern American Masters: O'Neill, Williams, and Miller.

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49. WATS - 3820 - Climate and Climate Change (DSC/QI)

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### 3. *Program Proposals*

Request from the Department Electrical and Computer Engineering in the College of Engineering to remove all emphases in the Electrical Engineering PhD.

<https://usu.box.com/s/3mhw17t2dt102rny4razhhq8v0bg0heg>

*Motion to approve the proposal from the Department of Electrical and Computer Engineering to remove all emphases in the Electrical Engineering PhD made by Dean Adams. Seconded by Dick Mueller. Proposal approved.*

### 4. *Other Business*

Jessica Hansen gave the committee an update on the Curriculog conference she just attended. She notified the committee that the forms needed to be taken down for a few weeks. Dawn Kirby asked that this not be done until after graduation. Dick Mueller would like to get an e-mail every time there is a request he needs to approve, not just in his weekly digest. Jessica provided the committee with some of the upcoming changes that will solve some of the issues.

Larry Smith notified the committee that Ed Reeve will not be the chairperson again next year (he has

held this position for a very long time). The committee needs to be thinking of who the new chair should be and come prepared to discuss at the April meeting.

Adjourned at 2:20 pm

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

**Institution Submitting Request:** Utah State University  
**Proposed Program Title:** English Teaching Composite  
**Sponsoring School, College, or Division:** College of Humanities and Social Sciences  
**Sponsoring Academic Department(s) or Unit(s):** English  
**Classification of Instructional Program Code<sup>1</sup> :** 13.1305  
**Min/Max Credit Hours Required to Earn Degree:** 120 / 126  
**Proposed Beginning Term<sup>2</sup>:** Fall 2016  
**Institutional Board of Trustees' Approval Date:**

**Program Type (check all that apply):**

<input type="checkbox"/> (AAS)	Associate of Applied Science Degree
<input type="checkbox"/> (AA)	Associate of Arts Degree
<input type="checkbox"/> (AS)	Associate of Science Degree
<input type="checkbox"/>	Specialized Associate Degree (specify award type <sup>3</sup> : )
<input type="checkbox"/>	Other (specify award type <sup>3</sup> : )
<input checked="" type="checkbox"/> (BA)	Bachelor of Arts Degree
<input checked="" type="checkbox"/> (BS)	Bachelor of Science Degree
<input type="checkbox"/>	Professional Bachelor Degree (specify award type <sup>3</sup> : )
<input type="checkbox"/>	Other (specify award type <sup>3</sup> : )
<input type="checkbox"/> (MA)	Master of Arts Degree
<input type="checkbox"/> (MS)	Master of Science Degree
<input type="checkbox"/>	Professional Master Degree (specify award type <sup>3</sup> : )
<input type="checkbox"/>	Other (specify award type <sup>3</sup> : )
<input type="checkbox"/>	Doctoral Degree (specify award type <sup>3</sup> : )
<input type="checkbox"/>	K-12 School Personnel Program
<input type="checkbox"/>	Out of Service Area Delivery Program

**Chief Academic Officer (or Designee) Signature:**

I, the Chief Academic Officer or Designee, certify that all required institutional approvals have been obtained prior to submitting this request to the Office of the Commissioner.

Noelle M. Cockett \_\_\_\_\_ Date:

I understand that checking this box constitutes my legal signature.

<sup>1</sup> For CIP code classifications, please see <http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55>.

<sup>2</sup> "Proposed Beginning Term" refers to first term after Regent approval that students may declare this program.

<sup>3</sup> Please indicate award such as APE, BFA, MBA, MEd, EdD, JD

## Utah System of Higher Education Program Description - Full Template

### Section I: The Request

Utah State University requests approval to offer the following Baccalaureate degree(s): English Teaching Composite effective Fall 2016. This program was approved by the institutional Board of Trustees on .

### Section II: Program Proposal

#### Program Description

*Present a complete, formal program description.*

The English Education program prepares students towards professional licensure and preparation in the teaching of secondary-level English. Students become versed in their academic subject matter (language, writing, literature, and multimedia); skilled in the methods of teaching the various components of the English curriculum and classroom management techniques; and committed to the achievement of all students. The English Teaching Composite offers a robust menu of courses, all within English, which recognizes the complexity and depth of English Studies. Students may choose among American Studies, Literature, and Writing for an emphasis. No teaching minor is required with a composite teaching major.

#### Consistency with Institutional Mission

*Explain how the program is consistent with the institution's Regents-approved mission, roles, and goals. Institutional mission and roles may be found at [higheredutah.org/policies/policyr312/](http://higheredutah.org/policies/policyr312/).*

USU's mission serves the public through learning, discovery, and engagement. As part of the land grant institution mission, programs are delivered to students on campuses across the state of Utah. USU's program for teacher licensure is nationally accredited. Teacher education draws on both theoretical and practice-based research in which students prepare to teach the next generation effectively and equitably.

Current Teaching Composite Teaching Majors at USU include Social Studies; Biological Sciences; Earth Sciences; Physical Sciences; Agricultural Education; Art Education; Music Education; Mathematics and Statistics Education; Theater Arts; Family and Consumer Sciences Education; Technology and Engineering Education.

### Section III: Needs Assessment

#### Program Rationale

*Describe the institutional procedures used to arrive at a decision to offer the program. Briefly indicate why such a program should be initiated. State how the institution and the USHE benefit by offering the proposed program.*

The current English Teaching Majors complete 42 credits for their degree and then take a teaching minor (minimum of 18 but usually higher). The English Education Student Advisory Group within USU's Department of English is in favor of an alternative composite degree. (A composite is the combination of two or more majors and can come from majors within the same department; several exist already at USU, particularly for teaching.) The composite, proposed at 61 credits, offers options to combine emphasis areas within the department (Literature; American Studies, Writing). Capacity exists in these areas to accommodate English Teaching students.

A "super" major in English Teaching helps these future teachers prepare more broadly for teaching



English at the secondary level, particularly in light of new Core Curriculum State Standards (CCSS). The existing major/minor option will continue to exist. However, it should be noted that a teaching minor no longer meets the "highly qualified teacher" standard set by NCLB. The professional advisor for the English Teaching program estimates that about one-third to one-half of majors will find the Composite attractive. For students who decide not to continue in English Teaching, it provides an easier option to move into the second major and still graduate on time. In terms of capacity issues, the advisors counsel that this change could be helpful in some areas that could use additional enrollment.

The traditional combination of a teacher major and teaching minor often exceeds 60 credits. The English Teaching Composite is set at 61 credits for completion and includes a clinical experience paired with an English methods course. This option likely means that students can graduate more efficiently.

This program was proposed by the English Education faculty within the Department of English. It was discussed with English Teaching majors at large and with the English Education Student Advisory Group in particular (two different groups over 2014-2016). The proposal was discussed and approved by the department's academic coordinating committee and then brought before the entire department as a whole for a vote, which was unanimously positive.

### **Labor Market Demand**

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

In Utah, demand for teacher education programs remains high. More than 30 percent of Utah teachers will retire in the next 10 years. Along with the loss of so many experienced teachers, Utah's population continues to grow at nearly twice the national average. Utah's student enrollment grew from 540,000 in 2007 to more than 680,000 students by 2014. At the same time, Utah needed 44,000 new teachers to meet this burgeoning population, according to a *Utah Educator Supply and Demand* study by Utah State University. A serious teacher shortage crisis is a likely possibility.

### **Student Demand**

*Provide evidence of student interest and demand that supports potential program enrollment. Use Appendix D to project five years' enrollments and graduates. Note: If the proposed program is an expansion of an existing program, present several years enrollment trends by headcount and/or by student credit hours that justify expansion.*

The English Education faculty and the professional advisor assessed student interest and demand and estimate that about 1/3 of the programs current enrollment (n=150) would opt for the composite degree if offered. Some students will continue with the teaching major/teaching minor pathway. Others choose to complete two teaching majors (most often true for English + language teaching majors).

### **Similar Programs**

*Are similar programs offered elsewhere in the USHE, the state, or Intermountain Region? If yes, identify the existing program(s) and cite justifications for why the Regents should approve another program of this type. How does the proposed program differ from or compliment similar program(s)?*

Within USHE, only one other composite degree in English Teaching exists: Southern Utah University. It is

a composite that combines English Teaching and Creative Writing. The USU English Teaching Composite is complementary as its emphases include American Studies, Literature, and Writing (creative, technical, and rhetoric).

#### Composite Teaching Majors at Other Universities

- Southern Utah University: Composite degree in Secondary Education/Creative Writing – 88 credits  
o [http://catalog.suu.edu/preview\\_program.php?catoid=8&poid=2489&returnto=1034](http://catalog.suu.edu/preview_program.php?catoid=8&poid=2489&returnto=1034)
- Black Hills State University: Composite degree in Communications/English Teaching – 54 credits  
o [http://catalog.bhsu.edu/preview\\_program.php?catoid=17&poid=1869&hl=%22English%22&returnto=search](http://catalog.bhsu.edu/preview_program.php?catoid=17&poid=1869&hl=%22English%22&returnto=search)
- West Texas A&M – 60-65 credits  
o [http://www.wtamu.edu/webres/File/Student%20Support/Advising/2014-2015%20Degree%20Checklists/FAH/English,%20Philosophy%20and%20Modern%20Languages/engl-lang-arts-7-12\\_ba\\_1415\\_f.pdf](http://www.wtamu.edu/webres/File/Student%20Support/Advising/2014-2015%20Degree%20Checklists/FAH/English,%20Philosophy%20and%20Modern%20Languages/engl-lang-arts-7-12_ba_1415_f.pdf)
- Sam Houston – BA in English; “minor” in Secondary Education  
o <http://www.shsu.edu/undergraduate-catalog/2012-2014/english/index.html>

#### Collaboration with and Impact on Other USHE Institutions

*Indicate if the program will be delivered outside of designated service area; provide justification. Service areas are defined in [higheredutah.org/policies/policyr315/](http://higheredutah.org/policies/policyr315/). Assess the impact the new program will have on other USHE institutions. Describe any discussions with other institutions pertaining to this program. Include any collaborative efforts that may have been proposed.*

USU already offers an English Teaching degree on its campuses and through Distance Education. The English Teaching Composite is a more robust option for those seeking a degree in teaching English. As a result, no impact on other programs within USHE is envisioned.

#### External Review and Accreditation

*Indicate whether external consultants or, for a career and technical education program, program advisory committee were involved in the development of the proposed program. List the members of the external consultants or advisory committee and briefly describe their activities. If the program will seek special professional accreditation, project anticipated costs and a date for accreditation review.*

No external review was solicited.

### Section IV: Program Details

#### Graduation Standards and Number of Credits

*Provide graduation standards. Provide justification if number of credit or clock hours exceeds credit limit for this program type described in R401-3.11, which can be found at [higheredutah.org/policies/R401](http://higheredutah.org/policies/R401).*

**Minimum GPA for Graduation:** 2.75 within major courses; 2.0 USU cumulative

**NOTE:** Secondary Teacher Education Program (STEP) Requirements: 3.0 USU cumulative required; 3.0

career total (for licensure)

**Minimum Grade Accepted:** C (no pass/fail) in major courses; B- in STEP courses (Note: C- or better in Quantitative Literacy (QL) course required by the Secondary Education Program)

**Number of Required Credits:** 60 (63 if required to take [ENGL 1410](#) - Grammar)

### Admission Requirements

*List admission requirements specific to the proposed program.*

**Minimum GPA for Admission:** 2.75 within all English courses (other than [ENGL 1010](#) , [ENGL 2010](#) , CLEP, AP, etc.); 2.75 USU cumulative (including courses taken for another USU major); 2.75 career total (including transfer credits) for new transfer students.

### Curriculum and Degree Map

*Use the tables in Appendix A to provide a list of courses and Appendix B to provide a program Degree Map, also referred to as a graduation plan.*

## Section V: Institution, Faculty, and Staff Support

### Institutional Readiness

*How do existing administrative structures support the proposed program? Identify new organizational structures that may be needed to deliver the program. Will the proposed program impact the delivery of undergraduate and/or lower-division education? If yes, how?*

Existing administrative structures support the proposed program, and no new organizational structures will be required to deliver the program. Because the program uses existing curriculum, faculty, and staff, the program is ready to be delivered immediately.

### Faculty

*Describe faculty development activities that will support this program. Will existing faculty/instructors, including teaching/graduate assistants, be sufficient to instruct the program or will additional faculty be recruited? If needed, provide plans and resources to secure qualified faculty. Use Appendix C to provide detail on faculty profiles and new hires.*

Existing faculty (and new hires that are replacing retiring faculty members) are sufficient to support this program. No graduate teaching assistants are associated with this pre-professional program.

### Staff

*Describe the staff development activities that will support this program. Will existing staff such as administrative, secretarial/ clerical, laboratory aides, advisors, be sufficient to support the program or will additional staff need to be hired? Provide plans and resources to secure qualified staff, as needed.*

Because this new composite teaching major relies on existing curriculum, faculty, and staff, no new resources are needed in staff lines.

### Student Advisement

*Describe how students in the proposed program will be advised.*

The Department of English has an advisor dedicated to advising students in the English Teaching program. The numbers of teaching majors are not envisioned to change, as the students will simply opt to continue the traditional English Teaching major or opt for the English Teaching Composite.

### **Library and Information Resources**

*Describe library resources required to offer the proposed program if any. List new library resources to be acquired.*

Existing library and information resources already exist that support the current program. Additionally, the English Education faculty have integrated digital literacy intentionally in all of its pre-professional courses.

### **Projected Enrollment and Finance**

*Use Appendix D to provide projected enrollment and information on related operating expenses and funding sources.*

## **Section VI: Program Evaluation**

### **Program Assessment**

*Identify program goals. Describe the system of assessment to be used to evaluate and develop the program.*

Program Objectives are listed at this site: [http://english.usu.edu/files/uploads/assessment%20reports/E\\_Ed\\_Learning\\_Objectives.pdf](http://english.usu.edu/files/uploads/assessment%20reports/E_Ed_Learning_Objectives.pdf).

Assessment of English Education and a historical overview of annual reports beginning in 2010, can be found at this link: <http://english.usu.edu/html/about/assessment>.

The most recent report on Data-Based Decisions is at this site: [http://english.usu.edu/files/uploads/assessment%20reports/E\\_Ed\\_Data\\_Based\\_Decisions.pdf](http://english.usu.edu/files/uploads/assessment%20reports/E_Ed_Data_Based_Decisions.pdf)

This report demonstrates how the English Education faculty gather information about the program, use that information to improve the program, and then continue the cycle in a spirit of continuous improvement.

### **Student Standards of Performance**

*List the standards, competencies, and marketable skills students will have achieved at the time of graduation. How and why were these standards and competencies chosen? Include formative and summative assessment measures to be used to determine student learning outcomes.*

Marketable skills:

1. Employment as an English teacher at the secondary level (following licensure through the STEP program administered through the School of Teacher Education and Leadership.

Standards

1. Understand reading and writing as socially constructed practices.
2. Know about and be able to use a variety of instructional strategies to meet students' diverse needs.
3. Be able to promote collaborative relationships among students and between students and teacher.
4. Know about and be able to select age-appropriate course materials.

5. Know about and be able to select age-appropriate literature, including adolescent literature.
6. Know about and be able to use technological aids in the teaching of literature and writing.
7. Be able to design and implement effective lesson plans and course curricula.
8. Have classroom management skills.
9. Understand and be able to use assessment strategies appropriate to the subject matter and the age and diversity of students.

These standards are drawn from the National Council of Teachers of English (NCTE). These standards also lead to and support Utah Effective Teaching Standards once these pre-service teacher are employed in the field following graduation and licensure: <http://www.uen.org/k12educator/uets/>.

#### Formative Assessment

1. Student work is graded within the courses during the semester.
2. Formative assessment is solicited from students during the course.
3. The professional advisor offers suggestions and career advice during the course of a student's undergraduate career.

#### Summative Assessment

1. Students assess the English Education program through a Qualtrics survey constructed to provide feedback on the effectiveness of the program.
2. Students assess their own growth in areas such as Information Technology and Ethics through course-by-course surveys delivered at the end of each pre-professional course.
3. Students (seniors) are assessed annually in capstone projects that also provide information to the faculty of the program in a spirit of continuous improvement.

## Appendix A: Program Curriculum

List all courses, including new courses, to be offered in the proposed program by prefix, number, title, and credit hours (or credit equivalences). Indicate new courses with an X in the appropriate columns. The total number of credit hours should reflect the number of credits required to be awarded the degree.

For variable credits, please enter the minimum value in the table for credit hours. To explain variable credit in detail as well as any additional information, use the narrative box at the end of this appendix.

Course Number	NEW Course	Course Title	Credit Hours
General Education Courses (list specific courses if recommended for this program on Degree Map)			
General Education Credit Hour Sub-Total			40
Required Courses			
ENGL 2600		Literary Analysis	3
		Choose from among 6 courses - Writing Explore	3
ENGL 3510		Teaching Young Adult Literature	3
ENGL 4500		Teaching Writing	3
ENGL 4510		Teaching Literature	3
ENGL 4520		Teaching Literacy in Diverse Setting (previously ENGL 4220)	3
ENGL 4530	X	English Clinical Experience	1
ENGL 4300		Shakespeare	3
Add Another Required Course			
Required Course Credit Hour Sub-Total			22
Elective Courses			
ENGL 3570		Approaches to Research in English Studies (QI)	3
ENGL 3500		Literacy, Community, and Service Learning	3
SCED 3100		Motivation and Classroom Management	3
SCED 4210		Assessment and Curriculum Design	3
SPED 4000		Education of Exceptional Individuals	3
SCED 5500		Student Teaching Seminar	2
SCED 5630		Student Teaching in Secondary Schools	10
SCED 4300		Clinical Experience II	1
Add Another Elective Course			
Elective Credit Hour Sub-Total			28
Core Curriculum Credit Hour Sub-Total			90

Are students required to choose an emphasis?  Yes or  No

Course Number	NEW Course	Course Title	Credit Hours
---------------	------------	--------------	--------------

Course Number	NEW Course	Course Title	Credit Hours
Name of Emphasis:		Literature	
		Choose 15 credits of Literary History (6 from Lit of Americas; 6 from Lit of Europe)	15
		Choose 9 credits from Authors & Genres	9
ENGL 4200 or 4210		Linguistics	3
ENGL 4540, ENG 4543		Choose 6 credits from Writing Electives	6
ENGL 2210, 2630		Choose from among 7 courses - Culture Exploration	3
Add Another Emphasis Course			
<b>Emphasis Credit Hour Sub-Total</b>			<b>36</b>
<b>Total Number of Credits to Complete Program</b>			<b>126</b>

Course Number	NEW Course	Course Title	Credit Hours
Name of Emphasis:		American Studies	
ENGL 2630		Survey of American Culture	3
		American Studies Foundation Courses (3 courses, one each from five disciplines)	9
		Literature & Folklore Courses	18
ENGL 4200, 4210		Linguistics	3
ENGL 4540, 5430		Writing	3
Add Another Emphasis Course			
<b>Emphasis Credit Hour Sub-Total</b>			<b>36</b>
<b>Total Number of Credits to Complete Program</b>			<b>126</b>

Course Number	NEW Course	Course Title	Credit Hours
Name of Emphasis:		Writing	
ENGL 3400, 3420		Writing Explore Course	3
		Literature Courses	15
ENGL 4200, 4210		Linguistics	3
ENGL 3080, 3400		Writing Courses	15

Course Number	NEW Course	Course Title	Credit Hours
Add Another Emphasis Course			
<b>Emphasis Credit Hour Sub-Total</b>			36
<b>Total Number of Credits to Complete Program</b>			126

Add An Emphasis

**Program Curriculum Narrative**

*Describe any variable credits. You may also include additional curriculum information.*

The English Teaching Composite offers students seeking a career teaching in secondary schools a solid foundation in English courses in addition to the ability to focus on one particular area: American Studies, Literature, or Writing. English Studies is a rich area with several subfields, including folklore, technical communication, gender studies, and ethnic studies. Students have flexibility in several areas to tailor the curriculum to their particular interests. Students graduate with a degree in English Teaching; licensure is obtained through the STEP program in the School of Teacher Education and Leadership.



## Degree Map

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

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

Toggle Cut-and-Paste

Toggle Table

First Year Fall	Cr. Hr.	First Year Spring	Cr. Hr.
ENGL 1010: Academic Prose	3	ENGL 2010: Intermediate Writing	3
ENGL 2600: Literary Analysis	3	ENGL 2210, 2630, 2720, 3070, 3620, 2700, or 37	3
Breadth Requirement	3	BHUT: CMST 1020 Public Speaking (BHU)	3
Breadth Requirement	3	Breadth Requirement	3
STAT 1040: Introduction to Statistics	3	Breadth Requirement	3
<b>Add Courses</b>	<b>Total</b>	<b>Total</b>	<b>15</b>
<b>Second Year Fall</b>	<b>Cr. Hr.</b>	<b>Second Year Spring</b>	<b>Cr. Hr.</b>
ENGL 3400, 3420, 2430, 3440, 4400, or 4410 (W	3	ENGL 3510: Teaching Young Adult Literature	3
ENGL 1410: Elements of Grammar	3	ENGL 3385: World Literature (or 3395 or 4430)	3
ENGL 3500: Literacy, Community, & Service Lea	3	ENGL Elective: Prose/Poetry/Drama (4340, 4350	3
ENGL 3520: Multicultural American Lit	3	Depth Social Sciences (DSS)	3
ENGL Literary History (Americas): 3355, 3365, 33	3	ENGL 33xx or higher literature elective	3
ENGL Literary History (British Isles):3305, 3315,	3	ENGL Literary History (Americas): 3355, 3365, 33	3
<b>Add Courses</b>	<b>Total</b>	<b>Total</b>	<b>18</b>
<b>Third Year Fall</b>	<b>Cr. Hr.</b>	<b>Third Year Spring</b>	<b>Cr. Hr.</b>
ENGL 4510: Teaching Literature	3	ENGL 4500: Teaching Writing	3
Depth Life and Physical Sciences (DSC)	3	ENGL 4220: Teaching Literacy in Diverse Classro	3
ENGL 4300: Shakespeare	3	ENGL xxxx: Clinical Experience	1
Quantitative Intensive	3	ENGL 5430: Professional & Tech Writing Capsto	3
ENGL 4540 Teaching Creative Writing (or other	3	ENGL 4XXX or higher Literature elective	3
ENGL 4200 or 4210 Linguistics	3	ENGL Literary History (British Isles): 3305, 3315,	3
<b>Add Courses</b>	<b>Total</b>	<b>Total</b>	<b>16</b>
<b>Fourth Year Fall</b>	<b>Cr. Hr.</b>	<b>Fourth Year Spring</b>	<b>Cr. Hr.</b>
SCED 3100: Motivation and Classroom Managem	3	SCED 5500: Student Teaching Seminar	2
SCED 4210: Assessment and Curriculum Design	3	SCED 5630: Student Teaching in Secondary Sch	10
SPED 4000: Education of Exceptional Individuals	2		

SCED 4300: Clinical Experiences II	1		
Elective	3		
Elective	2		
<b>Add Courses</b>	<b>14</b>		
		<b>Total</b>	<b>12</b>

## Appendix C: Current and New Faculty / Staff Information

### Part I. Department Faculty / Staff

Identify # of department faculty / staff (headcount) for the year preceding implementation of proposed program.

	# Tenured	# Tenure -Track	# Non -Tenure Track
Faculty: Full Time with Doctorate	25	5	1
Faculty: Part Time with Doctorate			
Faculty: Full Time with Masters			15
Faculty: Part Time with Masters			1
Faculty: Full Time with Baccalaureate			
Faculty: Part Time with Baccalaureate			
Teaching / Graduate Assistants	////	////	35
Staff: Full Time			5
Staff: Part Time			2

### Part II. Proposed Program Faculty Profiles

List current faculty within the institution -- with academic qualifications -- to be used in support of the proposed program(s).

	First Name	Last Name	Tenure (T) / Tenure Track (TT) / Other	Degree	Institution where Credential was Earned	Est. % of time faculty member will dedicate to proposed program.	If "Other," describe
<b>Full Time Faculty</b>							
	Benjamin	Gunsberg	TT	PhD	University of Michigan	50%	
	Steven	Shively	T	PhD	University of Nebraska	75%	
	Sonia	Manuel-	T	PhD	University of Kansas	20%	
	Joyce	Kinhead	T	EdD	Texas A&M University - Commerce	75%	
	Patricia	Gantt	T	PhD	University of North Carolina - Chapel Hill	100%	
	Genevieve	Ford	TT	PhD	University of Illinois	25%	
	Replacement Hire	USU - Uintah Basin	TT	PhD	TBD (Replacement of Virginia Exton)	50%	
	Brock	Dethier	T	PhD	University of Virginia	10%	
							Add Another Full Time
<b>Part Time Faculty</b>							
							Add Another Part Time

### Part III: New Faculty / Staff Projections for Proposed Program

Indicate the number of faculty / staff to be hired in the first three years of the program, if applicable. Include additional cost for these faculty / staff members in Appendix D.

	# Tenured	# Tenure -Track	# Non -Tenure Track	Academic or Industry Credentials Needed	Est. % of time to be dedicated to proposed program.
Faculty: Full Time with Doctorate					
Faculty: Part Time with Doctorate					
Faculty: Full Time with Masters					

	# Tenured	# Tenure -Track	# Non -Tenure Track	Academic or Industry Credentials Needed	Est. % of time to be dedicated to proposed program.
Faculty: Part Time with Masters					
Faculty: Full Time with Baccalaureate					
Faculty: Part Time with Baccalaureate					
Teaching / Graduate Assistants					
Staff: Full Time					
Staff: Part Time					

## Appendix D: Projected Program Participation and Finance

### Part I.

*Project the number of students who will be attracted to the proposed program as well as increased expenses, if any. Include new faculty & staff as described in Appendix C.*

Three Year Projection: Program Participation and Department Budget						
	Year Preceding Implementation	New Program				
		Year 1	Year 2	Year 3	Year 4	Year 5
<b>Student Data</b>						
# of Majors in Department	452	452	462	462	467	472
# of Majors in Proposed Program(s)		150	160	160	165	170
# of Graduates from Department	68					
# Graduates in New Program(s)						
<b>Department Financial Data</b>						
	Department Budget					
	Year Preceding Implementation (Base Budget)	Year 1	Year 2	Year 3		
		Addition to Base Budget for New Program(s)	Addition to Base Budget for New Program(s)	Addition to Base Budget for New Program(s)		
<i>Project additional expenses associated with offering new program(s). Account for New Faculty as stated in Appendix C, "Faculty Projections."</i>						
<b>EXPENSES – nature of additional costs required for proposed program(s)</b>						
<i>List salary benefits for additional faculty/staff each year the positions will be filled. For example, if hiring faculty in year 2, include expense in years 2 and 3. List one-time operating expenses only in the year expended.</i>						
Personnel (Faculty & Staff Salary & Benefits)	\$0	\$0	\$0	\$0	\$0	
Operating Expenses (equipment, travel, resources)	\$0	\$0	\$0	\$0	\$0	
Other:						
<b>TOTAL PROGRAM EXPENSES</b>		\$0	\$0	\$0	\$0	
<b>TOTAL EXPENSES</b>	\$0	\$0	\$0	\$0	\$0	
<b>FUNDING – source of funding to cover additional costs generated by proposed program(s)</b>						
<i>Describe internal reallocation using Narrative 1 on the following page. Describe new sources of funding using Narrative 2.</i>						
Internal Reallocation	\$0	\$0	\$0	\$0	\$0	
Appropriation	\$0	\$0	\$0	\$0	\$0	
Special Legislative Appropriation	\$0	\$0	\$0	\$0	\$0	
Grants and Contracts	\$0	\$0	\$0	\$0	\$0	
Special Fees	\$0	\$0	\$0	\$0	\$0	
Tuition	\$0	\$0	\$0	\$0	\$0	
Differential Tuition (requires Regents approval)	\$0	\$0	\$0	\$0	\$0	
<b>PROPOSED PROGRAM FUNDING</b>		\$0	\$0	\$0	\$0	
<b>TOTAL DEPARTMENT FUNDING</b>	\$0	\$0	\$0	\$0	\$0	
<b>Difference</b>						
Funding - Expense	\$0	\$0	\$0	\$0	\$0	

**Part II: Expense explanation**

**Expense Narrative**

*Describe expenses associated with the proposed program.*

No new expenses are associated with this proposed program since the English Teaching major already exists.

**Part III: Describe funding sources**

**Revenue Narrative 1**

*Describe what internal reallocations, if applicable, are available and any impact to existing programs or services.*

No reallocations are necessary since this is an expansion of an existing program that does not increase demands on the curriculum, faculty, or staff.

**Revenue Narrative 2**

*Describe new funding sources and plans to acquire the funds.*

No new funding sources are needed.

**Cover/Signature Page – Full Template**

**Institution Submitting Request:** Utah State University  
**Proposed Title:** Bachelor of Science Degree in Climate Science  
**School or Division or Location:** College of Agriculture and Applied Sciences  
**Department(s) or Area(s) Location:** Plants, Soils and Climate  
**Recommended Classification of Instructional Programs (CIP) Code<sup>1</sup> :** 40.0401  
**Proposed Beginning Date:** 01/02/2017  
**Institutional Board of Trustees' Approval Date:**

**Proposal Type (check all that apply):**

<b>Regents' Agenda Items</b>	
<i>R401-4 and R401-5 Approval by Committee of the Whole</i>	
SECTION NO.	ITEM
4.1.1 <input type="checkbox"/>	(AAS) Associate of Applied Science Degree
4.1.2 <input type="checkbox"/>	(AA) Associate of Arts Degree
	(AS) Associate of Science Degree
4.1.3 <input type="checkbox"/>	Specialized Associate Degree
4.1.4 <input checked="" type="checkbox"/>	Baccalaureate Degree
4.1.5 <input type="checkbox"/>	K-12 School Personnel Programs
4.1.6 <input type="checkbox"/>	Master's Degree
4.1.7 <input type="checkbox"/>	Doctoral Degree
5.2.2 <input type="checkbox"/>	(CER C) Certificate of Completion
5.2.4 <input type="checkbox"/>	Fast Tracked Certificate

**Chief Academic Officer (or Designee) Signature:**

I certify that all required institutional approvals have been obtained prior to submitting this request to the Office of the Commissioner.

\_\_\_\_\_  
**Signature**

**Date:**

**Printed Name:**

<sup>1</sup> CIP codes must be recommended by the submitting institution. For CIP code classifications, please see <http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55>.

**Executive Summary**  
**Higher Education Institution**  
**Bachelor of Science Degree in Climate Science**  
**2/29/2016**

## **Program Description**

The Climate Science Degree (CSD) Program in the Department of Plants, Soils and Climate is focused on understanding the nature and change of the climate system by applying the basic principles of mathematics, physics, and chemistry. The CSD Program will train the next generation of global leaders in climate and climate change sciences while promoting a citizenry informed on the science behind the important environmental and hazard issues of the time. This undergraduate degree program emphasizes the scientific study of the behavior of weather and climate, and applications to the important practical problems of climate prediction and weather forecasting for natural resources. The CSD Program is unique in that it incorporates fundamental knowledge of physical climate with the emergence of a new and more complete approach, encompassing all components of the climate system—atmosphere, water, and land surface—to gain a comprehensive understanding of climate change.

## **Role and Mission Fit**

As the state's only land-grant institution and home to the State Climate Office, Utah State University is the logical place to combine both climate science research and higher education. Because of the impact of climate variability on every segment of civilization, including food, water, energy, economy and security, climate science is a quintessential land-grant-university issue. The education mission of Climate Science Degree (CSD) Program is to provide its undergraduate students with a faculty of experienced and knowledgeable educators who provide current content in a field- and classroom-enriched learning environment. Modern facilities and advanced research provides students with the tools and experience required to make professional contributions to science and humanity. The CSD Program will facilitate the Departmental mission in developing innovative learning environments for educating climate scientists and scientifically literate citizens. It distributes knowledge to an audience of peers and citizens through academic literature and diverse professional activities.

## **Faculty**

USU is the logical place to lead the state's first climate undergraduate degree with its wide range of expertise in basic sciences, agriculture, engineering, and natural resources—all essential to the study of climate science and climate's impact on the state's people, resources, and economy. Climate variability and climate change research is happening at USU across a number of departments and colleges, and faculty resource at USU is sufficient to start the coordinated effort in producing a solid curriculum. To facilitate the CSD program, the Plants, Soils and Climate Department is currently recruiting two additional faculty positions to start in Fall 2016, to address primarily two teaching needs: (1) climate dynamics and modeling as it links climate to extreme weather to forecasting, and (2) paleoclimate observation providing an efficient method of covering the Earth's past climate variability. These two additional faculty members will greatly strengthen this proposed degree program.



## Market Demand

Modern climate sciences require skills in engineering, programming, and good communication. The proposed degree program will teach these skills with special attention to “big data” and physical processes, which translate into effective problem solving. These skills are in high demand in Utah where high tech industry is a priority. In the 21<sup>st</sup> century, any organizations who want to improve their climate-resilience and performance often do not have the internal know-how to develop climate impact solutions; as a result, hiring for climate-related majors has grown in a wide variety of industry sectors. Today’s financial market takes into account climate model outputs for various timeframes (days to decades). Climate resilience is a new expertise not a single B.S. program has possessed yet. USU graduates from the CSD Program can help companies or governments identify their key climate related challenges, after which he/she can develop support measures or to attract new solutions. Another type of job market is meteorology-related, both in the public sector (military and the federal government) and the private sector (media, commercial companies, insurance, etc.). Private-sector climatologists work in a variety of environments ranging from consulting businesses to commodity and insurance businesses. The number of private companies that hire meteorologist or climatologist has grown in the past few years. Even oil companies are watching the emerging climate-energy laws and risks<sup>2</sup>. The Utah Department of Workforce services rates atmospheric scientists and similar professionals as having a moderate to strong employment outlook.

## Student Demand

Since 2011, faculty teaching climate courses including Drs. Hipps, Gillies, Wang and Jin have been inquired by students about degree programs in climate or climate change. This newly emerged interest in climate-related issues is a welcoming sign that USU students are in-tune with this important global and societal issue. Their interest and inquiries also reflect a new trend in academia: Institutions around the nation (and around the world) are either creating or expanding academic programs, research programs, and centers around climate and climate change sciences. The effect of these efforts is to attract faculty, students, and research funds. As of 2014, at least 11 state universities in the U.S. have launched cluster-hires in climate change to meet the demand, but Utah is not one of them.

## Statement of Financial Support

Appropriated Fund.....	<input checked="" type="checkbox"/>
Special Legislative Appropriation.....	<input type="checkbox"/>
Grants and Contracts.....	<input type="checkbox"/>
Special Fees .....	<input type="checkbox"/>
Differential Tuition (must be approved by the Regents).....	<input type="checkbox"/>
Other (please describe).....	<input type="checkbox"/>

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<sup>2</sup> <http://www.climate-policy-watcher.org/?q=node/491>

## Similar Programs Already Offered in the USHE

USU will be the first in the Intermountain region to offer a BS degree dedicated to climate and climate change sciences. USU's graduate degree in Climate Sciences (established in 2013) sets apart from the more traditional, meteorological focus of atmospheric science departments as it covers not only the physical aspects of climate systems but also the applications of climate sciences. The University of Utah (UU) currently has a Department of Atmospheric Sciences with a teaching focus on weather forecasting and atmospheric physics. In 2013, USU's Climate Sciences graduate program made connection with the UU's Atmospheric Sciences Department and the two have agreed to share common courses, one of which is Advanced Dynamical Meteorology and the other is Matlab Programming.

**Program Description – Full Template  
Higher Education Institution  
Bachelor of Science Degree in Climate Science  
02/29/2016**

**Section I: The Request**

Utah State University, College of Agriculture and Applied Sciences requests approval to offer Climate Science Bachelor of Science (BS) Degree effective Spring 2017.

**Section II: Program Description**

**Complete Program Description**

The Climate Science Degree (CSD) Program in the Department of Plants, Soils and Climate is focused on understanding the nature and change of the climate system by applying the basic principles of mathematics, physics, and chemistry. This undergraduate degree emphasizes the scientific study of the behavior of weather and climate, and applications to the important practical problems of climate prediction and weather forecasting for natural resources. The CSD Program integrates basic and applied principles of climatology, environmental physics, and meteorology, which are concerned with how natural laws determine the climate. Physical meteorology and land surface physics are also part of climate science because the Earth's climate variability is strongly coupled to the oceans and the land. In addition, interactions between land ecosystems, water and climate are studied. This includes understandings and measurements of the atmosphere, soil, water and plants, and how the data are used to address practical issues related to climate change. The graduates will be well prepared to pursue graduate education in interdisciplinary science programs; they will also be suited for continuing the studies in atmospheric science, climatology, hydrology and most other physical sciences. The skills instilled in the graduates will qualify them as researchers or technicians in federal, state and university laboratories. They will also be qualified to work with private sectors to design and conduct observations and data analyses for tasks related to weather, climate, water, and energy.

The core training of the CSD Program focuses on the physical science of the climate system, one that concerns how natural laws determine the climate. As such, the basic curriculum must and will meet the guidelines of the American Meteorological Society (AMS) and the requirements for employment in the National Oceanic and Atmospheric Administration (NOAA) and a variety of consulting and professional meteorological/hydrological services. USU is a member of the University Corporation for Atmospheric Research, a consortium of more than 100 North American member colleges and universities focused on research and training in the atmospheric and related climate system sciences. The CSD Program is unique in that it also incorporates fundamental knowledge of physical climate with the emergence of a new and more complete approach, encompassing all components of the climate system—atmosphere, water, and land surface—to gain a comprehensive understanding of climate change.

**Purpose of Degree**

The CSD Program will train the next generation of global leaders in climate system and climate change sciences while promoting a citizenry informed on the science behind the important environmental and hazard issues. The Program aims to teach the students about the dynamics and physics of the oceanic

and atmospheric circulations and associated variability across different timescales, with a focus on weather systems, water cycles, and extreme events. Students graduating with a Climate Science Degree will have built a solid foundation in the physical aspects of climate system and climate change, enabling them to pursue specific graduate degrees (either in mitigation or physical research) or work in various sectors.

Climate and climate change studies are among the most rapidly growing topics in research, crossing physical science and social science. These are quintessential interdisciplinary studies, involving not only the physical aspects of earth science, but also the science of climatic impacts to natural systems and humanity, and mitigation of rapid change in natural systems. In Utah, these subjects are facing future planning not only for energy and agriculture, but also for water, soil, economics, recreation, and air pollution. Development in the subjects of climate and climate change will form broad umbrellas under which large and rapidly increasing research funds are being offered and deployed.

Institutions across the nation (and around the world) are creating and/or expanding academic programs, research programs, and research centers around climate and climate change. The net effect of these efforts has attracted faculty, students, and research funds. In 2014 alone, at least 11 major universities in the U.S. have launched cluster-hires of interdisciplinary nature that includes faculty in climate sciences to meet the increased demand. More programs are being established such as those in the University of California systems. Thus, it is timely and necessary for USU to build an organizational framework capable of connecting the many separate but related efforts into focused, coordinated endeavors on a degree program dedicated to climate science. Climate is about systems, and effectively studying complex and interacting systems requires learning through a broad spectrum of disciplines. Consequently, USU needs a basic degree devoted to climate change research and response – A Climate Science Degree Program.

## **Institutional Readiness**

Utah State University (USU), as one of the state's major universities and the state's only land-grant institution, is well-positioned to make major moves in this direction. There are a number of faculty already involved in climate science, climate change science, and sustainability — they are comprised of climate scientists and meteorologists, as well as geologists, ecologists, water scientists, soil scientists, sociologists, and engineers. USU also possess a successful Extension program necessary to expand the educational goals of climate sciences to the grassroots level, as well as to respond to critical and emerging climate issues in resources planning with research-based, unbiased information.

Current faculty and curriculum in the Department of Plants, Soils and Climate (PSC) comprise the research, teaching and outreach capacity to build a degree in climate and climate change sciences:

- A Climate Science Master and PhD Degree Program was established in 2013
- PSC climate faculty are gaining international research prominence with a strong academic record
- The Utah Climate Center (UCC) has a state mandate for providing climate information to the state and region, and has been more than successful in reaching this goal
- Climate faculty and UCC are part of the strong USU ecology and water centers that can build and broaden a degree program

PSC's climate faculty and climate center are nationally and internationally recognized leader in the research of climate diagnostics, prediction and extreme events, particularly as it pertains to the U.S. West; this facilitates transformation of science into the core curriculum of the Climate Science Degree.

Drawing on the faculty expertise of the Climate Science MS/PhD Program, strong foundation of the Utah Climate Center research, PSC's close association with USU's Ecology Center and Water Lab, and the two new climate faculty hires in Spring 2016, the new undergraduate program will provide students with an introduction into the science of climate and climate change. Many of USU students are starting in careers where the rules of climate are changing rapidly, and they need to be better prepared for this change. This proposed program will also attract students with a growing interest in pursuing the next big science that prevails in their generation.

## Departmental Faculty

Department Faculty Category	Dept Faculty Headcount – Prior to Program Implementation	Faculty Additions to Support Program	Dept Faculty Headcount at Full Program Implementation
<b>With Doctoral Degrees</b> (Including MFA and other terminal degrees, as specified by the institution)			
Full-time Tenured	25	2	27
Full-time Non-Tenured	0	0	0
Part-time Tenured	0	0	0
Part-time Non-Tenured	0	0	0
<b>With Master's Degrees</b>			
Full-time Tenured	0	0	0
Full-time Non-Tenured	5	0	5
Part-time Tenured	0	0	0
Part-time Non-Tenured	0	0	0
<b>Other</b>			
Full-time Tenured	0	0	0
Full-time Non-Tenured	0	0	0
Part-time Tenured	0	0	0
Part-time Non-Tenured	0	0	0
<b>Total Headcount Faculty in the Department</b>			
Full-time Tenured	25	2	27
Full-time Non-Tenured	5	0	5
Part-time Tenured	0	0	0
Part-time Non-Tenured	0	0	0
<b>Total Department Faculty FTE</b> <i>(As reported in the most recent A-1/S-11 Institutional Cost Study for "prior to program implementation" and using the A-1/S-11 Cost Study Definition for the projected "at full program implementation.")</i>	30	2	32

## Staff

Academic Advisor: A crucial element of the proposed program is a dedicated academic advisor. Fortunately, USU has this unique structure of Coordinator in the Student Services Center, employing staff serving as Academic Advisor for various departments. Currently, PSC has one dedicated Academic

Advisor whose role is advising incoming students. In the initial years of the program, this Academic Advisor will be able to serve the additional students. If enrollment grows to large numbers in the program, then advising loads will be revisited and an additional advisor may be warranted.

Graduate teaching assistant (TA): Graduate students serving as teaching assistants/lecturers are common in most departments of atmospheric sciences or meteorology, but not in USU. Thus, there is a need to allocate sufficient teaching assistantships that are compatible to research assistantships, i.e. \$1,300-1,600 per month per person, to help establish the undergraduate courses in basic meteorology and climate physics. Two fulltime TA will be requested through normal departmental channel based on course and student numbers. Undergraduate teaching fellows will be considered to facilitate this effort.

## **Library and Information Resources**

The institution currently has the needed library resources.

## **Admission Requirements**

Requirements for admission into the CSD Program in the College of Agricultural and Applied Sciences (CAAS) are consistent with general University admission requirements (one unit equals one high school year): 4 units of English, 4 units of mathematics, 3 units of natural sciences, 3 units of social studies, and 2 units of foreign language. Students must also meet performance requirements (ACT composite of 20 or higher OR combined SAT score of 950 or higher OR rank in the top one-half of graduating class; transfer students must have a 2.5 (on a 4.0 scale) cumulative grade point average and 2.5 on most recent term of attendance.

In addition to the minimum grade point average (GPA) requirements described in the University Policies, the Climate Science entrance-to-major requirement must also be completed with a minimum grade of C: MATH 1210. This course must be completed by the end of the semester during which the entrance-to-major process is carried out.

## **Student Advisement**

The scope of Climate Science is extremely broad and can be demanding. Students will be assigned to support groups consisting of six students and one faculty member. Support groups will meet 1-2 times per semester over lunch to discuss matters of mutual concern. The faculty member will serve as the faculty advisor for the students in his or her support group. It is common for students enrolled in physical science (like climate system) to need professional counseling to help them deal with academic or personal problems. Professional counseling on the USU campus will be provided by the center for Counseling and Psychological Services. In addition, upper-level climate students and faculty will participate in a USU program to build better high-school-to-university transition opportunities for diverse STEM-interested students – InTech Early Collegiate High School (InTech) and the Academy for Math, Engineering, and Science (AMES) are Title I public charter high schools serving diverse students and that provide rigorous, supportive learning environments that blend high school and the first two years of college to raise high school graduation and postsecondary success. The AMES students are 52% non-white with 44% of students receiving free or reduced lunch and with an even gender balance. In special situations, it may be possible for students to consult with a Counseling and Wellness Services psychologist. The Climate

Program will form a Student Progress Committee that reviews academic deficiencies and recommends a remediation plan or dismissal from the program, and to determine an appropriate course of action.

### Justification for Graduation Standards and Number of Credits

The design of the Climate Science Degree Program curriculum does not require more than 126 credit hours. Minimum requirements for this program are:

Minimum University Requirements			
Total Credits	125	Grade Point Average (most majors require higher GPA)	2.50 GPA
Credits of C- or better	100	Credits of upper-division courses (#3000 or above)	40
Total USU Credits	30	Upper-division USU Credits	20
USU Credits within the Major	15	Credits in Minor (if required)	12
Credits in Major	see below	Credits in American Institutions	3
<u>General Education Requirements</u>	see link	<u>University Studies Depth Requirements</u>	see link
<b>NOTES:</b> highest Math Requirement for this degree is			

### External Review and Accreditation

External consultants were not involved in the development of the program. There are already a group of USU faculty involved in climate science, climate change science, resources management and sustainability — they come from climate scientists and meteorologists, as well as geologists, ecologists, water scientists, soil scientists, sociologists, and engineers and are experienced educators.

### Projected Program Enrollment and Graduates; Projected Departmental Faculty/Students

Data Category	Current – Prior to New Program Implementation	PROJ YR 1	PROJ YR 2	PROJ YR 3	PROJ YR 4	PROJ YR 5
<b>Data for Proposed Program</b>						
Number of Graduates in Proposed Program	X	X	X	5	15	25
Total # of Declared Majors in Proposed Program	X	X	5	10	15	25
<b>Departmental Data – For All Programs Within the Department</b>						
Total Department Faculty FTE ( <i>as reported in Faculty table above</i> )	30	32	34	34	34	34
Total Department Student FTE ( <i>Based on Fall Third Week</i> )						
Student FTE per Faculty FTE ( <i>ratio of Total Department Faculty FTE and Total Department Student FTE above</i> )						

<b>Program accreditation-required ratio of Student FTE/Faculty FTE, if applicable: (Provide ratio here: _____)</b>						
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### Expansion of Existing Program

USU has not had any climate or meteorology undergraduate degree program before.

## Section III: Need

### Program Need

The recent increases in weather/climate extreme events and the irregular climate variability, together with the broader and connected challenge of global sustainability, are poised to dominate human endeavor and direction this century. The outcome of the 2015 Paris Climate Summit was historical: it concluded with a landmark agreement to curb greenhouse gas emissions around the globe including the United States. The impact of this outcome in the decades to come remains far from certain, and will touch every corner of the world's societies. The new treaty ends the strict differentiation between developed and developing countries that characterized earlier efforts, replacing it with a common framework that commits all countries to put forward their best efforts and to strengthen them in the years ahead. This includes, for the first time, requirements that all parties report regularly on their emissions and implementation efforts, and undergo international review. Therefore, in 10 or 20 years' time it will be up to the next educated generation to provide such complicated information, assessment, and mitigation plans. Utah State University will play a leading role in providing higher education of climate for this new generation.

As Utah's premier and only land-grant institution, USU is the logical place to lead the state in climate research and higher education. With its wide range of expertise in basic sciences, agriculture, engineering, and Extension infrastructure, USU is well positioned to lead regionally in educating the state's young generation in climate and climate change science. While climate variability and climate change research is happening at USU across a number of departments and colleges, these efforts are generally disconnected and few are transferrable into undergraduate education. What is lacking is a dedicated degree program around which expertise and faculty resource can be integrated to bring the cutting-edge science to undergraduate students.

Earth's climate will continue to change; the pace of that change will likely accelerate; and impacts to natural and human systems — already more significant than previously anticipated — will be severe. The simple truth of these statements is manifest in a slew of recent national and international synthesis reports representing a scale of effort unprecedented in science\*. Made clear in these reports is that meaningful response to these climate-induced challenges is not likely through incrementalism; transformational change is needed. Higher education provides an effective and necessary means to facilitate such a change. In view of these realities an appropriate and achievable vision should be articulated:

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\* See, for example: IPCC Fifth Assessment Report, Working Groups I-III (2014); The National Climate Assessment (2014); Climate Change, Evidence and Causes, An overview from the Royal Society and the US National Academy of Sciences (2014); What We Know: the Reality, Risks, and Response to Climate Change, AAAS (2014);



## VISION

*Utah State University will be a nationally and internationally recognized leader in the science of regional climate change and climate variability — particularly as it pertains to the U.S. West — and in transforming this science into a strong and rigorous degree program.*

The purpose of establishing the Climate Science Degree Program is to position Utah State University as the base for higher education on climate and climate change for Utah's next-generation citizens. One cannot effectively study climate change science — and all that it entails — without first also learning the climate science. Understanding future impacts to natural and human systems, formulating impact mitigation strategies, and formulating adaptation scenarios all begin with the climate science itself: What is the climate system going to be? Answering this question requires not only faculty and graduate students, but also an education entity that brings the next generation up to speed to this 21<sup>st</sup> century problem of climate change. The new program's close proximity with (and involvement of) agriculture and soils faculty will contribute to a successful degree program in the sciences of climate change mitigation.

### Labor Market Demand

Climate scientists, including meteorologists held about 11,100 jobs in 2012<sup>3</sup>. Employment of climate scientists is projected to grow 10 percent from 2012 to 2022, about as fast as the average for all occupations<sup>2</sup>. New computer models have vastly improved the accuracy and extent of forecasts and allowed climate scientists or meteorologists to tailor climate prediction to specific purposes. This will increase the need for climate scientists working in private industry as businesses demand more specialized weather and climate information. The best job prospects for climate science major are projected to be in private industry<sup>4</sup>. The industries that employed the most climate scientists in 2012 were as follows:

Professional, scientific, and technical services	36%
Federal government, excluding postal service	29%
Colleges, universities, and professional schools; state, local, and private	19%
Radio and television broadcasting	8%

In the federal government, most climate scientists work as weather forecasters with the National Weather Service or Climate Prediction Center of the National Oceanic and Atmospheric Administration (NOAA) in offices throughout the United States, some at airports, in or near cities, and occasionally stationed in critical but remote areas. The Department of Defense, which calls climate change an "immediate risk", employed several hundred climate scientists in 2012. In addition, hundreds of members of the Armed Forces are involved in climate/atmospheric science.

The job market for climate-background personnel has been going through a transformational change, from sections asking people of diverse background to conduct climate-related tasks into companies directly recruiting climate scientists or social scientists. Climate scientists involved in research often work in either governmental or university laboratories. Climate scientists who work in private industry will have to analyze climate change impact on society as a way to formulate insurance policy; this has been on growing demand

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<sup>3</sup> <https://collegegrad.com/careers/atmospheric-scientists-and-meteorologists>

<sup>4</sup> Source: Bureau of Labor Statistics, U.S. Department of Labor.

for the coastal regions (hurricanes and sea level rise), the Great Plains (tornado alley), and western states (drought and large fires).

As an example, some recent job postings for climate and climate change fields are provided below (<http://jobs.monster.com/v-engineering-q-climate-change-adaptation-jobs.aspx>):

**Job detail: "Long Term Agreement: Climate Change Adaptation Mainstreaming and Local Development Planning/Budgeting Specialists, UNCDF-LDFPA-Local Climate Adaptive Facility (Up to 6 Positions)"**

UNDP  
Indiana, IN  
Job detail: Long Term Agreement: Climate Change Adaptation Mainstreaming and Local Development Planning/Budgeting Specialists, UNCDF-LDFPA-Local Climate Adaptive Facility(Up to 6 Positions) This vacancy is advertised by UNDP Duty Station: Home Based with Travel to Countries Where LoCAL Operates in Africa, Asia and the Pacific Level: International Consul Contract type: - (More info about Levels and ...)

Posted 9 days ago

**Climate Change Adaptation and Mitigation Experts / Colombia**

ICF International  
Fairfax, VA  
Climate Change Adaptation and Mitigation Experts / Colombia(Job Number:1500002713)  
Description Energy, Environment and Transportation Colombia, South America About ICF International ICF International (NASDAQ:ICFI) provides professional services and technology solutions that deliver beneficial impact in areas critical to the world's future. ICF is fluent in the language of change, whether driv...

Posted 17 days ago

**Climate Change Adaptation and Water Security Experts / Peru**

ICF International  
Fairfax, VA  
Climate Change Adaptation and Water Security Experts / Peru(Job Number:1500001892)  
Description Energy, Environment and Transportation Peru About ICF International ICF International (NASDAQ:ICFI) provides professional services and technology solutions that deliver beneficial impact in areas critical to the world's future. ICF is fluent in the language of change, whether driven by markets, tech...

Posted 23 days ago

**Institute Associate, Adaptation and Online Tools - The Georgetown Climate Center,**

Georgetown University  
Washington, DC, 20319  
Institute Associate, Adaptation and Online Tools - The Georgetown Climate Center The Georgetown Climate Center ("GCC"), which is based at Georgetown University Law Center, seeks to advance effective climate, energy, and transportation policies in the United States - policies that reduce greenhouse gas emissions and help communities adapt to climate change. For six years, the Center has worked at ...

**Sustainability Planner (Climate Adaptation and Resiliency)**

Aecom Technology Corporation  
San Francisco, CA, 94118  
Job Summary The selected candidate will join the Sustainable Development Group, part of AECOM's global Planning + Economics Practice Line. The primary emphasis of the group is to promote socioeconomic and environmental sustainability in urban design, city planning, and policy projects. This is accomplished through employing rigorous economic and strategic planning techniques and developing innova...

Posted 103 days ago

**Senior Manager: Climate Change and Scientific Analytics**

CSC  
ALEXANDRIA, VA  
Job Title : Senior Manager: Climate Change and Scientific Analytics Requisition ID : 15000BA Job Category : Classic Engineering Job Type : Regular Primary Location : USA-VA: VIRGINIA-ALEXANDRIA Schedule : Full-time Remote Work Authorized : No Relocation Assistance: Not Available Travel : Yes, 10 % of the Time Clearance Level: Public Trust Employee Status : Regular Division: North...

Posted 28 days ago

**Climate Change And Natural Resources Practice Team Lead**

Engility Corporation  
Alexandria, VA, 22313  
RESPONSIBILITIES AND DUTIES: International Resources Group, an Engility company seeks an experienced international development professional to lead the group's programs in Climate Change, Natural Resources and Biodiversity Management (CNR) based in Alexandria, Virginia. Job Summary: The successful candidate will provide leadership and direct support to related business development, project perf...

Posted 66 days ago

**CLIMATE CHANGE AND NATURAL RESOURCES PRACTICE TEAM LEAD**

Engility Corporation  
Alexandria, VA  
More information about this job: RESPONSIBILITIES AND DUTIES: International Resources Group, an Engility company seeks an experienced international development professional to lead the group's programs in Climate Change, Natural Resources and Biodiversity Management (CNR) based in Alexandria, Virginia. Job Summary: The successful candidate will provide leadership and direct support to related ...

Posted 66 days ago

**Air Quality & Climate Change Partner/Principal Consultant (Baton Rouge/New Orleans)**

ERM  
Baton Rouge, LA, 70804  
ERM seeks a motivated Air Quality & Climate Change Partner/Principal Consultant, with significant consulting experience and client relationships, to grow our air quality services business in Baton Rouge or New Orleans, LA. This is a partner / partner-track opportunity for a professional looking to further advance their career with a global environmental leader, and to make a significant impact in ...

The National Oceanic and Atmospheric Administration (NOAA) has recently established its Climate Service, a comprehensive and integrated office responsible for NOAA's climate science, data, information and services. It provides an integrated government entity for users across the nation in much the same way NOAA's National Weather Service has been providing weather information and services for 140 years. Individuals, local and national governments and the private sector are increasingly demanding this information to be able to better understand, adapt to, and plan for a changing climate. The expertise needed for the NOAA Climate Service will include research labs, climate observing systems, modeling facilities, integrated monitoring systems and extensive on the ground service delivery infrastructure. All of these service components are tied into the Climate Science theme the proposed program aims to educate.

## Student Demand

Students in and around Utah are consciously aware of the uncertain future of natural and water resources, such as winter snowpack and drought severity. These conditions are sensitive to the changing climate conditions. As impacts of climate change become an inescapable global reality, the field of climate science

is more important than ever. Earning a Bachelor of Science is the first step for future students in this field, and increased employment opportunities on environmental impacts by climate change are seen in both government agencies and private sectors.

As of 2014, eleven major universities across the U.S. have launched cluster-hires in climate change to meet the demand. A survey conducted among the department chairs of some newly established climate undergraduate programs indicates a promising student demand:

- School of Earth and Climate Sciences, University of Maine – established for 4 years with around 50 students and an increasing trend in enrollment and an excellent placement rate (contact: Prof. Scott Johnson)
- Climate Science Degree Program, University of Nebraska – established for 1.5 year (contact: Prof. John Carroll)
- BS for Climate Science, University of Idaho – established for 2.5 years with 16 students completed (contact: Prof. John Abatzoglou)
- BS in Earth Sciences with a Climate emphasis, San Francisco State University – established less than 1 year with ~24 students enrolled (contact: Prof. Dave Dempsey)

Having taught climate-related classes for the past five years, current climate faculty members (Drs. Hipps, Gillies, Wang, and Jin) have noted an increase in interest or request about climate science or climate change degree programs at USU. These professors are regularly probed by students with an interest in climate change and learning about how to obtain and apply such knowledge. The PSC academic advisor, Lisa Allen, has noted in the past two career affairs that students inquired for a Climate Science Degree at USU. This emergence of interest in climate and climate change is a welcoming sign that USU students are in-tune with this important global and societal issue. Their interest and inquiries also reflect a new trend in academia: Institutions around the nation (and around the world) are either creating or expanding academic programs, research programs, and centers around climate and climate change sciences. The effect of these efforts will also attract faculty, students, and research funds.

### **Similar Programs**

Currently, no similar programs in the area of climate and climate change sciences exist in Utah. Across USU, there also is not a single major or program that engages in the physical aspects of climate. However, as pointed out previously, some similar degree programs have recently emerged in the western U.S., mostly in the states of California and Washington. The University of Utah has a Department of Atmospheric Sciences that is focused on the meteorological training, weather forecasting, and physical or chemical properties of the atmosphere (e.g., microphysics); they did not offer climate prediction and climate change sciences. In recent years however, realizing the need for climate change research, the UU Atmospheric Sciences department recruited two faculty members specialized in large-scale climate dynamics. These two faculty have been in collaboration with USU climate faculty over the past five years. Thus, the proposed undergraduate degree in Climate Science will be the first in the Intermountain region.

### **Collaboration with and Impact on Other USHE Institutions**

No collaborative proposals were developed with other USHE institutions. Each state is unique in its geography and demography, and this uniqueness translates into the different needs and focus of the state's citizen. The prime purpose of the Climate Science Degree Program at USU is to serve Utah,

providing its future students with state-of-the-art knowledge and comprehensive education in the emerging climate sciences. Therefore, the new program is not likely to impact other USHE institutions that serve their own unique purposes and audience. However, it is not anticipated that students of other USHE institutes who are interested in climate science to transfer to USU's Climate Science Degree Program.

## **Benefits**

The changing climate is a major scientific and social challenge that will dictate many career options and also demands particular technical skills. This program addresses the need to train students to understand, use, integrate, interpret and communicate disparate data to advance climate and climate change sciences – this is unique among all higher-education institutions across the state of Utah. Doing so will increase student interest and student enrollment in the area of climate science. The interdisciplinary research and education infrastructure of USU and PSC department can provide an additional working model for other USHE institutions to observe and adopt.

## **Consistency with Institutional Mission**

The mission of USU is to be one of the nation's premier land-grant and space-grant universities by fostering the principle that academics come first, and by serving the public through learning, discovery, and engagement. The proposed degree program in Climate Science fits this mission and it will facilitate the emerging research themes across disciplines to study climate change impacts, such as sociology, ecology and agriculture. By establishing a BS degree in Climate Science, USU will show the nation and the world a vision to advancement and preparedness of humanity; doing so also fulfills the USU goal #9 "Communicate the success of the University to the world."

## **Section IV: Program and Student Assessment**

### **Program Assessment**

Evaluation and assessment will be assisted by the USU STE<sup>2</sup>M Center in conjunction with the routine external reviews. Full evaluation of the Climate Science Degree Program's effectiveness requires a comprehensive approach to ensure its goals are attained with regard to outcomes, processes, and their interactions. The CSD Program will apply the so-called Kirkpatrick's 4-level model of evaluation, which separately examines student learning, transfer of skills in applied settings, stakeholder reactions, and broader outcomes. To assess program success, formative and summative data will be collected from program students and faculty, as well as individuals from outside the university with regular, formal student contact during and after their graduation. This degree can be either terminal or non-terminal, with the "climate dynamics" track (see page 21 the 3<sup>rd</sup> block of elective credits) more inclined to a non-terminal degree towards graduate schools in physical climate research and other tracks ready for employment.

**a) Students.** At each semester end, students will complete anonymous course evaluations and surveys eliciting opinions on the value of program learning experiences, the extent of skill development toward their professional goals, and facets of the program (courses, mentorship, research experiences, etc.) they find to be most and least helpful. Open-ended items will invite suggestions for concrete ways to improve the program in both the near and long terms. In addition to these survey elements, students receiving supervised lab-based research or conducting undergraduate research projects will complete brief scales of

graduate advisement experiences and research experiences. Students participating in extra-academic internships will also complete research self-efficacy and access to research infrastructure subscales.

**b) Faculty.** The group of program faculty will meet once per semester with an evaluator to discuss their perspectives on the strengths and weaknesses of the program as implemented, with the goal of reaching consensus on approaches to refining the program to better meet its articulated goals. The USU STE<sup>2</sup>M Center will serve as a facilitator during discussions to direct the focus toward concrete actions for the improvement of the program. The STE<sup>2</sup>M Center will also interview faculty individually to follow up on concerns and ideas.

**c) Direct Measures.** Key indicators of program effectiveness are students' persistence and completion of the degree program (with particular attention to underrepresented groups), their abilities to contribute to substantive scientific advances, interpret findings from scholarly articles, and conducted research in their final semester. Additionally, students' ability to obtain employment in a climate-related capacity following completion of their degree will reflect the opinions of employers as to graduates' capacity to serve as professionals in climate forecasting or adaptation careers. The rate of Climate Science Degree Program students in attaining these traditional markers of success will be compared against that of students from other, comparable programs within USU through collaboration with USU's Office of Accreditation, Analysis, and Assessment which keeps statistics on enrollment, retention, degree completion, time to degree, etc.

**d) Professional Contacts.** As students meet others in professional interactions (e.g., extra-academic experiences, internships), USU's Office of Accreditation, Analysis, and Assessment will contact their non-faculty supervisors to request the completion of a short comparative assessment of the students' skills, abilities, and knowledge base as reflected in their performance. This survey will ask about students' quality on both a criterion basis and in comparison to their previous encounters with students not from the Climate Science Degree Program regarding readiness to solve important problems in the field through data analysis, scientific communication ability, and ability to engage productively as part of an interdisciplinary team.

### **Expected Standards of Performance**

The B.S. in Climate Science will be thorough, intense, and rigorous. This will provide students with a solid grasp of all of the fundamentals in physical climate systems, and will also focus on general science concepts, mathematics, and data-analytical skills. In addition to developing scientific knowledge, bachelor's degree students must also build writing, communication and critical thinking skills. Learning assessment will take place at two levels of performance. At the level of the individual course or program element (e.g., suite of core courses), student performance on exams, papers, and other demonstrations of adequate performance will be compared against students from other PSC programs enrolled concurrently, as well as against pre-existing standards of academic performance. After receiving training delivered by the STE<sup>2</sup>M Center to attain reliability, faculty will use integrated forms of two previously validated rubrics to assess research quality for reports and proposals (available at STE<sup>2</sup>M Center) and a separate rubric to assess the quality of scientific communication (from faculty/instructor feedback), in order to provide consistent performance-based assessment mechanisms and criteria across facets of the program.

The CSD students must be able to apply their knowledge to solve meaningful and challenging problems facing the field. To evaluate their progress, faculty will use the rubrics described above to assess research performance in supervised term paper settings after student completion of upper-level courses. Thus,

program faculty will identify and evaluate students' use of specific skills and concepts taught earlier in the program as they complete later courses and mentored research opportunities to communicate as feedback to program participants and as part of formative evaluation. During faculty meetings or through semester-end interviews with the students, faculty will identify those skills that students successfully and unsuccessfully applied in new contexts, so that weaknesses in academic preparation can be remedied and successful practices leveraged more broadly throughout the program.

## Section V: Finance

### Department Budget

Three-Year Budget Projection							
Departmental Data	Current Departmental Budget – Prior to New Program Implementation	Departmental Budget					
		Year 1		Year 2		Year 3	
		Addition to Budget	Total Budget	Addition to Budget	Total Budget	Addition to Budget	Total Budget
<b>Personnel Expense</b>							
Salaries and Wages	\$676,828	\$55,158	\$731,986	\$0	\$731,986	\$0	\$731,986
Benefits	\$30,457	\$2,482	\$32,939	\$0	\$32,939	\$0	\$32,939
<b>Total Personnel Expense</b>	\$707,285	\$57,640	\$764,925	\$0	\$764,925	\$0	\$764,925
<b>Non-Personnel Expense</b>							
Travel	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Capital	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Library	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Current Expense	\$90,206	\$0	\$90,206	\$0	\$90,206	\$0	\$90,206
Total Non-Personnel Expense	\$90,206	\$0	\$90,206	\$0	\$90,206	\$0	\$90,206
<b>Total Expense (Personnel + Current)</b>	\$797,491	\$57,640	\$855,131	\$0	\$855,131	\$0	\$855,131
<b>Departmental Funding</b>							
Appropriated Fund	\$797,491		\$855,131		\$855,131		\$855,131
Other:							
Special Legislative Appropriation							

Grants and Contracts	\$5,587,562		\$5,587,562		\$5,587,562		\$5,587,562
Special Fees / Differential Tuition							
<b>Total Revenue</b>	\$797,491		\$855,131		\$855,131		\$855,131

<b>Difference</b>							
Revenue-Expense	\$0	\$	\$0	\$	\$0	\$	\$0
Departmental Instructional Cost / Student Credit Hour* (as reported in institutional Cost Study for "current" and using the same Cost Study Definition for "projected")	\$374.40	\$	\$374.40	\$	\$374.40	\$	\$374.40

\* *Projected Instructional Cost/Student Credit Hour* data contained in this chart are to be used in the Third-Year Follow-Up Report and Cyclical Reviews required by R411.

## Funding Sources

To make this Climate Science BS possible, additional faculty are needed to teach courses not presently offered at USU. Two new faculty positions have been approved and are being recruited, to start in FY2016. These positions are earth systems modeling and dendroclimatology.

*Cooperation with the National Central University in Taiwan:* A novel part of this program is in the sharing of four core courses and six elective courses (see the Program Curriculum) with the National Central University (NCU)'s Department of Atmospheric Sciences in Taiwan, located 30 miles south of the capital city Taipei. The USU President and the Dean of CAAS have signed the Student Exchange Agreement with the NCU counterpart. In these agreements (Appendix), students will be participating in an exchange program where USU students in their 3<sup>rd</sup> or 4<sup>th</sup> year will live in Taiwan and attend classes there, while only paying tuition at USU. The exchange will not affect department expenditures. Students not able to make the physical exchange possible will participate in shared courses via Interactive Video Conferencing (IVC) established by the USU Regional Campuses and Distance Education. These arrangements will be facilitated through USU's Association for Information System. The USU distance learning facility is scheduled to be installed at NCU in spring 2016.

## Reallocation

No reallocation is proposed.

## Impact on Existing Budgets

Minimal impacts are expected on existing budgets due to new faculty coming to the department in 2017 in dendroclimatology and and earth systems modeling. Program support such as advising and some teaching support will be managed by current staff and current operating budgets.

## Section VI: Program Curriculum

### All Program Courses (with New Courses in Bold)

Four required core courses and additional four elective courses will be taught through Curriculum Exchange (Appendix) established between USU and the Department of Atmospheric Sciences, National Central University (NCU) in Taiwan. Agreements are being secured to enable USU students to travel to NCU for one year, taking these courses within two semesters. For those who do not or cannot travel, these NCU courses will be taught through distance education facility in a similar way of taking any USU online courses. An equal number of NCU students will come to USU for the same amount of time, taking any course offered in the Climate Science Degree Program curriculum, and interact with USU students.

Course Prefix and Number	Title	Credit Hours
<u>Required Courses</u>		
MATH 1210, 1220	Calculus I & Calculus II	8
MATH 2250	Linear Algebra and Differential Equations	4
MATH 2210	Multivariable Calculus	3
STAT 2000	Statistical Methods	3
PSC 2000	The Atmosphere and Weather	3
CHEM 1210	Principles of Chemistry	4
PSC 3000	Fundamentals of Soil Science	4
PHYS 2210	Physics for Scientists & Engineers I	4
WATS 3000	Oceanography	3
<b>PSC NCU-R2</b>	<b>Atmospheric Thermodynamics</b>	3
GEO 1110	Dynamic Earth-Physical Geology	3
<b>PSC NCU-R1</b>	<b>Atmospheric Instrumentation and Operation</b>	4
<b>PSC NCU-R3</b>	<b>Atmospheric Dynamics I</b>	3
<b>PSC NCU-R4</b>	<b>Atmospheric Physics</b>	3
PSC 5900	Boundary Layer Meteorology	3
PSC 5500	Land-Atmosphere Interactions	3
PSC 5003	Remote Sensing of Land Surfaces	4
<b>PSC 5400 (new hire)</b>	<b>General Meteorology</b>	3
GEO 5680	Paleoclimatology	3
POLS 4820	Natural Resources and Environmental Policy	3
PSC 5123	Climate Data Analyses	3
<b>Sub-Total</b>		<b>77</b>



Course Prefix and Number	Title	Credit Hours
Elective Courses (take up to 7 credits of the following courses)		
JCOM 1130	Beginning Newswriting for the Mass Media	3
GEO 3100	Natural Disasters	3
ENVS 3600	Living with Wildlife	3
ECN 3170	Law and Economics	3
ENVS 5550	Sustainability: Concepts and Measurement	3
CEE 3610	Environmental Management	3
APEC 5560	Natural resources and environmental economics	3
WATS 4490	Small Watershed Hydrology	4
CEE 5940	Snow Hydrology	3
PSC 5270	Environmental Plant Physiology	2
CEE 3430	Engineering Hydrology	3
GEO 3200	The Earth Through Time	4
CS 3430	Computational Science: Python and Perl Programming	3
PSC 5000	Environmental Instrumentation	2
PSC NCU-E1	MATLAB Programming and Application	3
PSC NCU-E2	Climatology & Monsoons	3
PSC NCU-E3	Boundary Meteorology	3
PSC NCU-E4	Air Pollution	3
PSC 5670	Environmental Soil Physics	3
<b>Sub-Total</b>		<b>7</b>
General Education + Capstone		32 + 4
<b>Sub-Total</b>		<b>36</b>
Track/Options (if applicable)		
<b>Sub-Total</b>		<b>n/a</b>
<b>Total Number of Credits</b>		<b>120</b>

### Example of Program

Admissions Requirements for this Program					
New freshmen	Admitted to USU in Good Standing	Transfer students from other institutions or other programs at USU	2.75 GPA		
First Year					
Fall Semester	Credits	General Education Info and Notes:	Spring Semester	Credits	General Education Info and Notes:
GEOG 1110: Physical Geology	3		CHEM 1110: General Chemistry (BPS)	4	
MATH 1210: Calculus I (QL)	4		PSC 2000: The Atmosphere and Weather	3	
ENGL 1010: Introduction to Writing: Academic Prose (CL1)	3		ENGL 2010: Intermediate Writing: Research Writing in a Persuasive Mode (CL2)	3	

SOC 1010: Introductory Sociology (BSS)	3		MATH 1220: Calculus II (QL)	4	
POLS 1100: United States Government and Politics	3		USU 1360: Climate Change on Earth	3	
Comments 16 credits			Comments 17 credits		

### Second Year

Fall Semester	Credits	General Education Info and Notes:	Spring Semester	Credits	General Education Info and Notes:
WILD 2200: Ecology of Our Changing World (BLS)	3		PSC 4810: Climate and Climate Change (DSC/QI)	3	
Breadth Humanities (BHU) Course	3		GEO 3300: Geology of the World's Ocean	3	
PHYS 2210: Physics for Scientists and Engineers I (QI)	4		MATH 2210: Multivariable Calculus	3	
MATH 2250: Linear Algebra and Differential Equations (QI)	4		CHEM 1210: Principles of Chemistry	4	
PSC 3000: Fundamentals of Soil Science	3		WATS 3000: Oceanography	3	
Comments 17 credits			Comments 16 credits		

### Third Year

Fall Semester	Credits	General Education Info and Notes:	Spring Semester	Credits	General Education Info and Notes:
PSC NCU-R2: Atmospheric Thermodynamics	3		GEO 5680: Paleoclimatology	3	
PSC NCU-R4: Atmospheric Physics	3		PSC 5003: Remote Sensing of Land Surfaces	4	
PSC 5400: General Meteorology	3		PSC 5270: Environmental Plant Physiology	3	
PSC NCU-R1: Atmospheric Instrumentation and Operation	4		PSC NCU-R3: Atmospheric Dynamics I	3	
Comments 14 credits			Comments 14 credits		

### Fourth Year

Fall Semester	Credits	General Education Info and Notes:	Spring Semester	Credits	General Education Info and Notes:
PSC 5900: Boundary Layer Meteorology	3		Practicum	4	
PSC 5123: Climate Data Analyses	3		PSC NCU-E4: Air pollution	3	
PSC 5000: Environmental Instrumentation	4		POLS 4820: Natural Resources and Environmental Policy	3	

GEO 3100: Natural Disasters	3		PSC 5500: Land-Atmosphere Interactions	3	
Comments			Comments		
13 credits			13 credits		

## Section VII: Faculty

List of current faculty within the institution with their qualifications:

- Robert Gillies, Professor, PSC – Areas include remote sensing, meteorology, climatology
- Larry Hipps, Professor, PSC – Areas include air-land interaction, boundary layer meteorology, instrumentation
- Simon Wang, Associate Professor, PSC – Specialized in climate dynamics, synoptic meteorology, climate prediction
- Jiming Jin, Associate Professor, PSC/WATS – Areas cover hydroclimatology, regional climate modeling
- Scott Jones, Professor, PSC – Expert in soil physics, hydrological science, instrumentation
- Sarah Null, Assistant Professor, WATS – Areas include water resource management, climate change
- Patrick Belmont, Associate Professor, WATS – Specialized in watershed hydrology, sediment dynamics, geomorphology
- Beth Nelson, Associate Professor, CEE – Research in stream dynamics, climate change impact
- Tammy Rittenour, Associate Professor, GEOL – Specialized in paleoclimatology
- (New Hire 2016), PSC – Areas include tree-ring climatology, dendro-hydrology, climate variability
- (New Hire 2016), PSC – Areas are in the physical and computational sciences of climate dynamics
- (Potential New Hire 2017), PSC – Extension Climatologist