Department of Geological Sciences
Central Connecticut State University
Geological Sciences Program Self- Study
2014-2015

Appendices

CCSU Geological Sciences student Samantha Corallo preparing a telescope mirror in Stellafane, VT

CCSU Geological Sciences students on a Geological Society of Connecticut field trip to western Connecticut

CCSU Geological Sciences student Jessica Johnson explaining her poster at the northeast section meeting of the Geological Society of America in Lancaster, PA

Submitted by:
Mark A. Evans, Chair
January 29, 2015

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i. Bednarski
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i. ESCI 221 Mineralogy
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vi. ESCI 322 Petrology
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i. ESCI 100 Search In Earth Science: Climate Change
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Appendix I: Department of Geological Sciences Student Accomplishments

Academic year (2014-2015)

Student Presentations at Professional Meetings (each a published abstract)

Bleached sandstones of the Triassic red beds of the Hartford basin, Connecticut. Poster by **Justin Ahern** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Addressing major geoscience misconceptions in an introductory historical geology course. Poster by **Samantha Corallo and Melissa Luna** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Structural geometry and deformation history of the eastern Valley and Ridge province, central Pennsylvania. Poster by **Matthew Costa** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Evaluating concentrations of arsenic and other trace elements within an agricultural catchment of the Ten-mile estuary system, Lebanon, CT. Poster by **Johnathan Feldman, Trevor Calzon, and Amanda Cross** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Stable isotope geochemistry of calcite and dolomite veins from Ordovician limestones from the Nittany anticline, Valley and Ridge province of Pennsylvania. Poster by **Emily Gajda** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

A virtual field experience on Mars via Earth analog outcrops and gigapixel imagery. Poster by **Jessica Johnson** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Assessing Streams and Soil Sediments Contamination by Trace Elements within the Scantic River watershed, East Windsor, CT. Poster by **Brian Litwin** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Assessing student understanding in an environmental geoscience class. Poster by **Melissa Luna and Jessica Johnson** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Structural geometry of the Nittany Anticline, central Pennsylvania. Poster by **Shawn Mines** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Stable isotope geochemistry of calcite and dolomite veins from Silurian and Devonian limestones in the western Valley and Ridge province of Pennsylvania. Poster by **Deanna Pietkevich** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Paragenesis of Mesozoic fault zone minerals and lead isotope analysis of associated galena in central and western Connecticut. Poster by **Nathan Pirovane** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

A statistical analysis of geoscience misconceptions among introductory physical geology students. Poster by **Mark Summa** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Investigating the fluid history of quartz veins using petrography, SEM-cl, and fluid inclusion microthermometry: examples from the Pennsylvania Valley and Ridge province. Poster by **Vanessa Swenton** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Igneous and sedimentary clasts found within the conglomerate strata of the Jurassic Portland Formation: implications for source regions. Poster by **Trevor Ziomek and Noel Cortes** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2015, Bretton Woods, NH

Student Awards

Justin Ahern was awarded the 2014-2015 CCSU Undergraduate Research and Creative Activity Day (URCAD) Senior Prize for Natural and Applied Sciences. Justin will present his work at both the URCAD at CCSU and the 2015 National Undergraduate Research Conference at Eastern Washington University in April 2015.

Jonathan Feldman was awarded a $2000 scholarship from the Environmental Professionals' Organization of Connecticut (EPOC)

Other Publications

Evans, M. A., and **Sale, G.,** 2015, Regional fracture systems in the Pennsylvania Valley and Ridge province, a record of Alleghenian stress direction. Geological Society of America Abstracts with Programs.

Oyewumi, O., **Cross, A.,** and **Feldman, J.,** 2015, Evaluating the Mobility and Transport of Trace Elements within the Coginchaug River Estuary System, Durham, CT., Geological Society of America Abstracts with Programs.

Wizevich, M. C., and **Ahern, J.,** 2015, Fluvial architecture in the Triassic New Haven arkose, Hartford basin: evolution of a fluvial system., Geological Society of America Abstracts with Programs.

Academic year (2013-2014)

Student Presentations at Professional Meetings (each a published abstract)

Triassic sedimentary rocks of southwestern Switzerland - the tale of the shale. Poster by **Justin Ahern** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2014, Lancaster, PA

Fluid history and paleo-overburden during the Alleghenian orogeny: central Pennsylvania Valley and Ridge province.. Poster by **Amanda Delisle** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2014, Lancaster, PA

Paleo-fluid and deformation conditions during the Alleghenian orogeny: southern Pennsylvania Valley and Ridge province. Poster by **Amanda Delisle** at the Annual meeting of the Geological Society of America (GSA) – October 2013, Denver, CO

The gigapan guide to Mars: using a virtual field trip to compare Earth and Mars. Poster by **Jessica Johnson** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2014, Lancaster, PA

Identification of BY Draconis Variables Stars in ASAS Data. Poster by **Jessica Johnson** at the American Astronomical Society, Washington, D.C., January, 2014.

Identification of BY Draconis Variable Stars Among ASAS Cepheid Candidates. Poster by Jessica Johnson at the 102nd Meeting of the American Association of Variable Star Observers. Woburn, MA, October, 2013.

Structural and geochemical analysis of veins from limestones in the west-central Valley and Ridge province of Pennsylvania. Poster by **James Marino** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2014, Lancaster, PA

Thermophysical and morphological analysis of ice-related modification in the northeastern Argyre Basin, Mars. Poster by **Ryker Nolan** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2014, Lancaster, PA

Geochemical assessment of stream sediment along Piper Brook, Park River watershed, Connecticut. Poster by **Heidi Olszewski** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2014, Lancaster, PA

Paleofluids within fault zones of the Hartford basin: evidence from fluid inclusions. Poster by **Nathan Pirovane** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2014, Lancaster, PA

Development, fluid history, and paleo-overburden of the middle and upper Devonian sequence, eastern Pennsylvania Valley and Ridge. Poster by **Glenn Sale** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2014, Lancaster, PA

Identification of Cepheid Variables in ASAS Data. Poster by **Vanessa Swenton** at the 102nd Meeting of the American Association of Variable Star Observers. Woburn, MA, October, 2013.

Student Awards

Justin Ahern received a $500 Faculty-Student Research Grant for examining the "Paleoenvironmental Interpretation of the Triassic Reptile Trackway Localities of the Emosson Area, Switzerland."

Amanda Cross received a $2000 Summer Faculty-Student Research Grant for "Evaluating mobility and transport of trace elements within Coginchaug River estuary systems, Durham, CT."

Amanda Delisle was awarded a $2500 American Institute of Professional Geologists (AIPG) Scholarship.

Heidi Olszewski received the 'Best Poster Award' at the CCSU URCAD presentations.

Nathan Pirovane received a $1547 Summer Faculty-Student Research Grant for the "Examination of lead deposits in Central Connecticut."

Nathan Pirovane was accepted into the Hawaii volcanoes field camp held in July 2014.

The CCSU Earth Science students were awarded a chapter of the 100-year old **Sigma Gamma Epsilon** Earth Sciences Honor Society. We are the Theta Zeta Chapter. This is only the seventh chapter in New England.

Other Publications

Evans, M.A., **Leo, J.,Lafonte, C. J.,** and **Delisle, A.,** 2014, Spatial and temporal changes in deformation conditions and paleofluid chemistry in the Devonian shale sequence of the central Appalachians during the Late Paleozoic: evidence for local and regional fracture connectivity, American Association of Petroleum Geologists Bulletin.

Wizevich, M. C., Meyer, C. A., and **Ahern, J.,** 2014, Sandstones of the autochthonous Triassic cover of the aiguilles rouges massif, southwestern Switzerland, Geological Society of America Abstracts with programs, vol. 46.

Academic year (2012-2013)

Student Presentations at Professional Meetings (each a published abstract)

History of fracture opening, temperature, and fluid pressure in the Marcellus shale, west-central Pennsylvania valley and ridge. Poster by **Amanda Delisle** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2013, Bretton Woods, NH

Analysis of toxic metals in stream sediments in the Middletown pegmatite district, Connecticut. Poster by **Ryan Lafleur** and **Amanda Cross** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2013, Bretton Woods, NH

Fracture development, fluid history, and paleo-overburden of the Devonian shale sequence, southern Pennsylvania valley and ridge. Poster by **Chris Lafonte** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2013, Bretton Woods, NH

Structural and geochemical analysis of veins from limestones in south-central valley and ridge province of Pennsylvania. Poster by **James Marino** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2013, Bretton Woods, NH

Structural evolution of the Nittany anticlinorium thrust system: west central valley and ridge of Pennsylvania, Maryland, and West Virginia. Poster by **Alex O'Farrill** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2013, Bretton Woods, NH

Compilation of brittle fault data for Connecticut: relationships to earthquake distribution. Poster by **Chanel Perez** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2013, Bretton Woods, NH

Brittle deformation patterns and lamprophyre intrusions in Holyoke basalt of the Higby mountain fault block. Poster by **Nathan Pirovane and Mark Summa** (co-authors) at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2013, Bretton Woods, NH

Student Awards

Chris Lafonte was awarded a $1500 Carol A. Ammon Scholarship from the School of Arts & Sciences

Other Publications

Evans, M.A., **Leo, J., Lafonte, C. J.,** and **Delisle, A.,** submission 5/13, Spatial and temporal changes in deformation conditions and paleofluid chemistry in the Devonian shale sequence of the central Appalachians during the Late Paleozoic: evidence for local and regional fracture connectivity, American Association of Petroleum Geologists Bulletin.

Piatek, J.L., C.L. Kairies-Beatty, W.L. Beatty, M.C. Wizevich, and **A. Steullet.** 2012. Developing virtual field experiences for undergraduates with high-resolution panoramas (GigaPans) at multiple scales. Geological Society of America Special Papers, 492, 305-313.

Academic year (2011-2012)

Student Presentations at Professional Meetings (each a published abstract)

Fracture patterns and paleo-overburden along a retrodeformed cross-section across the Pennsylvania salient. Poster by **Scott Braddock** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2012, Hartford, CT

Towards the differentiation of three volcaniclastic units in southwestern Utah, results of petrographic and geochemical analyses. Poster by **Scott Braddock** (co-author) at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2012, Hartford, CT

Analysis of toxic metals in stream sediments along piper brook, park river watershed, Connecticut. Poster by **Shannon Guerrera** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2012, Hartford, CT

Uncovering the main trackway at Dinosaur State Park (Rocky Hill, CT) in preparation for the 50th anniversary rededication. Poster by **Christopher Lafonte** (co-author) at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2012, Hartford, CT

Fluid inclusion study of veins in the Marcellus shale along the Appalachian structural front in central Pennsylvania: paleofluids and thermal maturity. Poster by **Jeremy Leo** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2012, Hartford, CT

Layered crater ejecta on mars as potential evidence for subsurface ice. Poster by **Ryker Nolan** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2012, Hartford, CT

Analysis of toxic metals in stream sediments in the bass brook watershed, New Britain, Connecticut. Poster by **Michael Redman** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2012, Hartford, CT

Laboratory analyses of silicified layers within the volcaniclastic unit of the Oligocene Brian Head Formation, southwestern Utah. Poster by **Troy Shinkle** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2012, Hartford, CT

Analysis of trace metals in stream sediments near an abandoned copper mine, Bristol, Connecticut. Poster by **Charlene Singh** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2012, Hartford, CT

Interpretation of fluid-flow pathways and mineralization conditions of barite concretions in the late cretaceous wahweap formation, southern Utah, Poster by **Alex Steullet** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2012, Hartford, CT

Between a rock and a hard place: perspectives from a modern female involved in field geology. Oral presentation by **Alex Steullet** at the Northeastern Section meeting of the Geological Society of America (GSA) – March 2012, Hartford, CT

Student Awards

Ali Steullet was awarded the 2011-2012 CCSU Undergraduate Research and Creative Activity Day (URCAD) Senior Prize for Natural and Applied Sciences. Ali presented her work at both the URCAD and the 2012 National Undergraduate Research Conference in Utah in April 2012.

Scott Braddock was awarded a $2000 scholarship from the Environmental Professionals' Organization of Connecticut (EPOC)

Scott Braddock was awarded a URCAP grant for travel to NE GSA

Scott Braddock was accepted into the Juneau Ice Fields Field Camp

Chanel Perez was accepted into the Volcanic Studies Field Camp in Kamchatka, Russia

Other Publications

Evans, M.A., **Leo, J.,** and Burruss, R.C., 2012, Spatial and temporal variation in fluids in the Devonian Marcellus shale during deformation of the central Appalachian Fold-and-thrust belt. Proceeding of Geofluids VII, International Conference, IFP, Paris, France.

Academic year (2010-2011)

Student Presentations at Professional Meetings (each a published abstract)

Concretion composition and geometry in the Late Cretaceous Wahweap Formation, southern Utah: evidence for fluid-flow conditions. Poster by **Alex Steullet** at the Northeastern – North Central Joint Meeting of the Geological Society of America (GSA) – March 2011, Pittsburgh, PA.

Analysis of formation brine chemistry by stratigraphic horizon in the central Appalachians. Poster by **James Lacey** at the Northeastern – North Central Joint Meeting of the Geological Society of America – March 2011, Pittsburgh, PA.

Depositional and paleoenvironmental study of a lake sediment core from northern Connecticut. Poster by **Shannon Guerrera** at the Northeastern – North Central Joint Meeting of the Geological Society of America – March 2011, Pittsburgh, PA.

Floodplain paleosols in the Upper Cretaceous Wahweap Formation, Kaiparowits Basin, southern Utah. Poster by **Ken Boling** at the Northeastern – North Central Joint Meeting of the Geological Society of America – March 2011, Pittsburgh, PA.

Student Awards

Ken Boling was awarded the 2010-2011 CCSU Undergraduate Research and Creative Activity Day (URCAD) Senior Prize for Natural and Applied Sciences. Ken presented his work at both the URCAD and the 2011 National Undergraduate Research Conference in Ithaca, NY in April 2011.

Ali Steullet was accepted into the James Madison University geology field camp held in Ireland in May 2011.

Ali Steullet received a Geological Society of America Outstanding Poster Award for her poster listed above.

Shannon Guerrera received a Geological Society of America Outstanding Poster Award for her poster listed above.

Other Publications

Wizevich, M.C., Piatek, J.L., and **Steullet, A.,** 2010, Online high-resolution panoramas as teaching tools for introductory geoscience courses, Geol. Soc. America Abstracts with Programs, v. 42, no. 5, p. 446.

Moran, K., Hilbert-Wolf, H.L., **Golder, K.,** Malenda, H.F., Smith, C.J., Storm, L.P., Simpson, E.L., Wizevich, M.C., and Tindall, S.E., 2010, Attributes of the wood-boring trace fossil Asthenopodichnium xylobiotum in the Late Cretaceous Wahweap Formation, Utah, USA: Palaeogeography, Palaeoclimatology, Palaeoecology, v. 297, p. 662-669.

Malenda, H.F., Simpson, E.L., Wizevich, M.C., Tindall, S.E., and **Boling, K.S.**, 2010, Morphological variation and experimental compaction in the Colorado Plateau biological soil crusts: implications for their possible recognition in the rock record, Geol. Soc. America Abstracts with Programs, v. 42, no. 5, p. 468.

Academic year (2009-2010)

Student Presentations at Professional Meetings (each a published abstract)

*Oligocene ichnofossils in non-marine limestone of the Brian Head Formation, Utah***.** Poster by **Keenan Golder** presented at the Annual Meeting of the Geological Society of America – October 2009, Portland OR.

Understanding controls on Connecticut drumlin morphology, location, and orientation using LiDAR and GIS analyses. Poster by **Ken Boling** presented at the Northeastern – Southeastern Joint Meeting of the Geological Society of America – March 2010, Baltimore, MD.

Brittle structures in the Holyoke basalt of the Hartford basin: ground-truthing LiDar linears. Poster by **Tyson Martin** presented at the Northeastern – Southeastern Joint Meeting of the Geological Society of America – March 2010, Baltimore, MD. ** **Best Poster Award****

Using high-resolution panoramas of the geology of the western U.S. to illustrate concepts in introductory geoscience courses. Poster by **Alex Steullet** presented at the Northeastern – Southeastern Joint Meeting of the Geological Society of America – March 2010, Baltimore, MD.

Silicified layers within the volcaniclastic unit of the Oligocene Brian Head Formation, southern Utah. Poster by **Troy Schinkel** presented at the Northeastern – Southeastern Joint Meeting of the Geological Society of America – March 2010, Baltimore, MD.

Student Awards

Keenan Golder was awarded the 2009-2010 CCSU Undergraduate Research and Creative Activity Day (URCAD) Senior Prize for Natural and Applied Sciences. Keenan presented his work at both the URCAD and the 2010 National Undergraduate Research Conference in Missoula, Montana in April 2010.

Tyson Martin received a 'Best Poster Award' at the Northeastern – Southeastern Joint Meeting of the Geological Society of America – March 2010, Baltimore, MD

Other Publications

Piatek, J.L., **A. Steullet**, W.L. Beatty, and C. Kairies Beatty. 2010, Creating Virtual Field Trips with Panoramic Imagery. The Professional Geologist**.**

Academic year (2008-2009)

Student Presentations at Professional Meetings (each a published abstract)

Fluid inclusion microthermometry of quartz veins from the Wepawaug schist, southern Connecticut. Poster by **Daniel Dabrowski** presented at the Northeastern Meeting of the Geological Society of America – March 2009, Portland, ME

Wetland trace fossils in the Paleogene Brian Head Formation, Southwest Utah. Poster by **Keenan Golder** presented at the Northeastern Meeting of the Geological Society of America – March 2009, Portland, ME

Paleofluids in brittle faults from the western border fault zone of the Hartford basin: Evidence from fluid inclusions. Poster by **Earl Manning** presented at the Northeastern Meeting of the Geological Society of America – March 2009, Portland, ME

Using virtual field trips of Connecticut geology in an introductory geology curriculum. Poster by **Alex Steullet** presented at the Northeastern Meeting of the Geological Society of America – March 2009, Portland, ME

Student Awards

Earl Manning was awarded a $500 research grant from the Northeast Section of the Geological Society of America.

Academic year (2007-2008)

Student Presentations at Professional Meetings (each a published abstract)

Hydrogeologic characterization of a mountaintop seepage lake in central Connecticut. Poster by **Michelle Tedone** presented at the Northeastern Meeting of the Geological Society of America – March 2008, Buffalo, NY.

Sedimentology of the 31-T drill core from the lower Jurassic Portland Formation, Hartford Basin, Connecticut. Poster by **Daniel Dabrowski** presented at the Northeastern Meeting of the Geological Society of America – March 2008, Buffalo, NY.

Academic year (2006-2007)

Student Presentations at Professional Meetings (each a published abstract)

Paleofluids in brittle faults from the western border fault zone of the Hartford basin: Evidence from fluid inclusions. Poster by **Earl B. Manning** presented at the Northeastern Meeting of the Geological Society of America – March 2007, Durham, NH.

Appendix II: Plan to Split The Physics and Earth Sciences Department

Proposal to Split the Department of Physics, Earth Science and Science Education into two new departments

Prepared by Dean's Office
School of Engineering, Science, and Technology

EXECUTIVE SUMMARY

- **both groups of faculty agree that splitting into two separate departments is the best course of action.**
- **The dean's office of the School of Engineering, Science, and Technology negotiated the split with the faculty from both groups. The resulting proposal has the following benefits:**
    - **Creates two departments, each with like-minded faculty and similar goals.**
    - **An equitable division of the existing resources with no net increase in operating budget or load credit***
    - **each department will have its own budget**
    - **An administrative structure for managing shared personnel, resources, and space.**

  *the only unavoidable extra expense is associated with the chair stipend (12.5.5). Although the stipend will decrease for the current chair from ~$3074.85 to ~$2049.90, the decrease is not equal to the stipend resulting from the creation of a second chair position ~$2049.91.

- **each department has selected a new name. The physics faculty will belong to the Department of Physics and Engineering Physics, while the earth science and science education faculty will comprise the Department of Geological Sciences**

Background

The faculty of the existing department have expressed an interest to split the department into two new departments; one with the faculty from Physics and the other containing the Earth Science and the Science Education faculty. The two resulting departments, referred to throughout the rest of this document as **Earth Science** and **Physics** each prepared a "white paper" outlining their needs and their suggestions/requests as part of the split (attached). This document proposes to reconcile the issues facing the split and attempts to negotiate a split that is equitable and based on all available data. *Effort has been made to accomplish this split with minimal additional resources. There is only a single additional required financially based resource that is unavoidable –see chair load section.*

Faculty of the two resulting Departments:

Earth Science (7)	**Physics (5)**
Marsha Bednarski	Peter LeMaire
Mark Evans	Nimmi Sharma
Kristine Larsen	Nanjundiah Sadanand
Oluyinka Oyewumi	Luisito Tongson
Jennifer Piatek	Anton Naumov

Jeffrey Thomas	
Michael Wizevich	
Craig Robinson – Planetarium Technician	

Main Office/Secretary/Copy-Fax Room: Both groups agree to share the main office (NC506) and secretary. The main office is where the faculty mailboxes are located. The current secretary is Sandra O'Day. She is a full-time secretary. Both groups are in agreement that a single secretary can support both departments. In addition both groups have agreed to share the copy/fax room (NC 546) – see budget section below for details on copier/fax supplies.

Conference Room (NC510): The 5th floor has a single conference room that is primarily used by students for study purposes/tutoring. It can also be used as a meeting place for faculty and student. Both groups have agreed to share the conference room.

Technician: (Peter Galamitakis) – the department has a full time departmental technician that currently supports both sets of faculty. The job description for the technician will be revised to clearly articulate how the technician is to split his time 50/50 between the two departments.

Planetarium/ Planetarium Technician: (Craig Robinson)- the planetarium has its own budget to cover the cost of student work/UA's and supplies. The budget is completely separate from the Earth Science/Physics budget. The Planetarium and the Planetarium Technician will be aligned with the Earth Science Department but will retain its own budget.

Indirect Account: the department currently has an account that contains monies derived from the indirect portion of grants. Indirect grant funds are allocated across campus to various offices including a portion that is given to the department for use at their discretion. The indirect account funds will be split 50/50 between the two departments.

Student Workers: The entire budget (OE +DPS) was reallocated appropriately to each department. No funds were designates as DPS for students workers. Each department can decide what proportion of their OE that they would like to allocate as DPS.

Chair Load: The current chair load for the Physics/Earth Science department is 9 load hours. Upon the split of the two groups the resulting chair load will be 6 load hours for each department, or a net of 3 additional load hours per semester. The 3 net LH's will be covered through the use of 3 credits from the side letter agreement (SL-87-93-5) that allows for up to 6 credits for the Physics faculty. The Physics faculty will still retain 3 LH to be designated for laboratory preparation as prescribed in the side letter. *Both chairs will receive the chair stipend as described in the Collective Bargaining Agreement as described in* ***Article 12.5.5.***

Chair Office: The two groups have agreed to allow the current chair of the Earth Science group to remain in the space that adjoins the main office. For now, the Physics faculty member to serve as the chair will use their office as the chair's office. This issue will be revisited in the future to determine if space can be realigned to allow for closer proximity of both chair's offices with the main office.

Budget: - the total amount (OE +DPS) allocated to the Physics/Earth Science group each year is $39,475. From this amount ~ $8475 is used for office supplies/copier paper supplies/ and technical supplies (associated with the work of the technician). In addition in the past, approximately $7000 has been set aside as DPS for student workers. This leave approximately

$24,000. ***After reviewing the budget portion of each proposal and all available data including students served, course offerings, laboratory sections, the most equitable split is as follows:***

BEGINNING BUDGET ALLOCATION - **$39475.00**

- OFFICE/TECH SUPPLIES**(PHYS01)** -(shared between the two departments) - **$8475.00**
  -this amount should be sufficient to maintain the office as in the past without the need to identify specific parties for the various common supplies (i.e. all faculty will have equal access to the copier paper, pens etc.)
- DPS (student workers) - **$0.00 –** This amount will be at the discretion of each group and will come from their allocation.
- REMAINING BALANCE OF BUDGET - **$31,000**
  - Physics Group (~60%)**(PEP001)** - **$18000.00**
    - Realized budget for Physics is $22,237.50 (assuming 50% of the Office/Tech Budget)
  - Earth Science (~40%) –**(GEOL01) $13000.00**
    - Realized budget for Earth Science is $17,237.50 (assuming 50% of the Office/Tech Budget)

Space: This is the one area that has ongoing negotiations. A new lab for the physics group is nearing completion on the second floor. This is the first step in the realigning of some of the space on the 5th floor. Each group will continue to meet with the Dean to discuss the space issues.

Departmental Names:
The Earth Science group is proposing to name the resulting department as the **Department of Geological Sciences**

The Physics group is proposing to name the resulting department as the **Department of Physics and Engineering Physics.**

Appendix III: Geological Sciences Undergraduate Major Degree Programs

Geology BS

The following courses are required for the major:

GEOLGICAL SCIENCES Core (33-35 credits)

ESCI 121 The Dynamic Earth OR ESCI 131 Environmental Geoscience, 3 Credits
ESCI 125 The Dynamic Earth Lab OR ESCI 135 Environmental Geoscience Lab, 1 Credit
ESCI 141 Earth and Life History, 3 Credits
ESCI 145 Earth and Life History Lab, 1 Credit
ESCI 221 Mineralogy, 4 Credits, Prerequisites: ESCI 121/125 or 131/135, CHEM 161/162
ESCI 223 Stratigraphy & Sedimentology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135, 141/145
ESCI 290 Field Methods, 2 Credits, Prerequisites: ESCI 121/125 or 131/135 or 141/145
ESCI 321 Structural Geology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135, 141/145
ESCI 322 Petrology,4 Credits, Prerequisite: ESCI 221
ESCI 360 Research Methods in Geological Sciences, 1 Credit, Prerequisite: Sophomore standing
ESCI 424 Geomorphology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135
Capstone Experience:
ESCI 460 Senior Research Project, 2-4 Credits
OR
External Geology Field Camp, 4 Credits

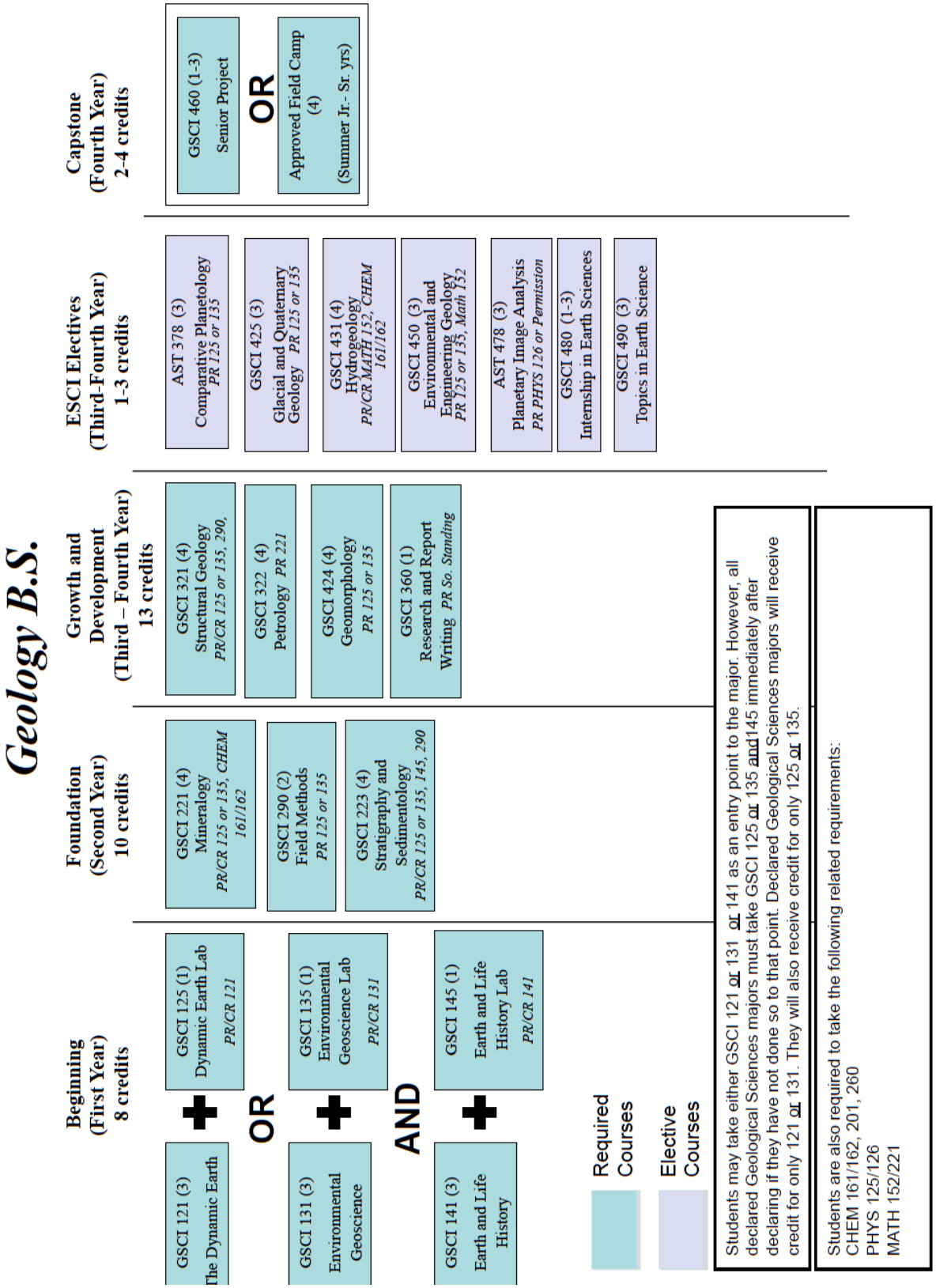
Related Requirements (16 Credits)

CHEM 161 General Chemistry, 3 Credits
CHEM 162 General Chemistry Lab, 1 Credit
CHEM 201 Foundations of Analytical Chemistry Laboratory, 1 Credits
CHEM 260 Foundations of Inorganic Chemistry, 3 Credits
PHYS 125 University Physics I, 4 Credits
PHYS 126 University Physics II, 4 Credits

Geological Sciences Electives (1-3 Credits from the following)

ESCI 425 Glacial and Quaternary Geology, 3 Credits, Prerequisites: ESCI 121/125 or 131/135
ESCI 431 Hydrogeology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135
ESCI 450 Environmental and Engineering Geology, 3 Credits, Prerequisites: ESCI 121/125 or 131/135
GEOG 378 Geographic Information Systems, 3 Credits
AST 378 Comparative Planetology, 3 Credits, Prerequisites: ESCI 121/131or AST 208
AST 478 Planetary Image Analysis, 3 Credits, Prerequisites: PHYS 126 or permission of the instructor
ESCI 480 Internship In Geological Sciences, 1-3 Credits
ESCI 490 Topics in Geological Sciences, 3 Credits
May include: Energy Resources, Volcanology, Environmental Geochemistry

The following flow chart shows the ideal pathway for a student to progress through the program. However, most of our majors decide to declare the major in their sophomore, junior, or occasionally senior year. We occasionally have students just do the major after graduating with a BS at another school. Therefore, the pathway is rarely followed, and serves only as a guideline.



Earth Science BS

The following courses are required for the major:

GEOLOGICAL SCIENCES Core (20-24 credits)

ESCI 121 The Dynamic Earth OR ESCI 131 Environmental Geoscience, 3 Credits
ESCI 125 The Dynamic Earth Lab OR ESCI 135 Environmental Geoscience Lab, 1 Credit
ESCI 141 Earth and Life History, 3 Credits
ESCI 145 Earth and Life History Lab, 1 Credit
ESCI 129 Introduction to Meteorology 4 Credits
AST 208 Planetary Astronomy OR AST 209 Stellar and Galactic Astronomy, 4 Credits
ESCI 221 Mineralogy, 4 Credits, Prerequisites: ESCI 121/125 or 131/135, CHEM 161/162
Methods Class:

ESCI 290 Field Methods, 2 Credits, Prerequisites: ESCI 121/125 or 131/135 or 141/145
OR
AST 278 Observational Astronomy, 4 Credits

ESCI 360 Research Methods in Geological Sciences, 1 Credit, Prerequisite: Sophomore standing
Capstone Experience:

ESCI 460 Senior Research Project, 2-4 Credits
OR
ESCI 280 Internship in Geological Sciences 1-3 Credits

Focus Areas (12-16 Credits from one of the following two focus areas)

Astronomy and Planetary Geology

ESCI 322 Petrology, 4 Credits, Prerequisite: ESCI 221
ESCI 330Astrophysics, 3 credits, Prerequisites: PHYS 125
AST 378 Comparative Planetology, 3 Credits Prerequisite: ESCI 121/131 or AST 208
ESCI 424 Geomorphology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135
AST 470 Extrasolar Planets and Astrobiology, 3 credits
AST 478 Planetary Image Analysis, 3 Credits, Prerequisites: PHYS126 or permission of the instructor

Environmental Geological Sciences

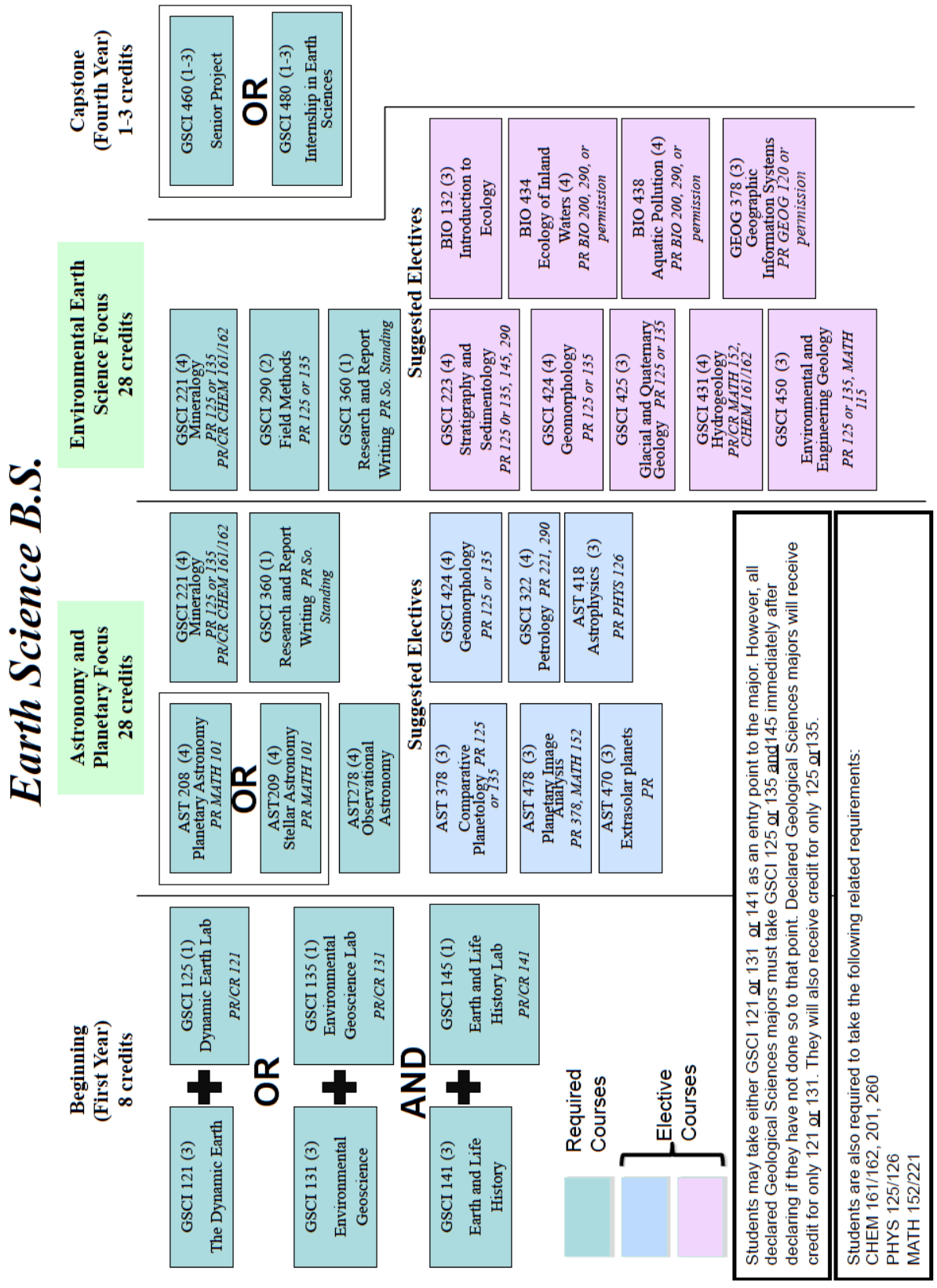
ESCI 223 Stratigraphy & Sedimentology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135, 141/145
ESCI 424 Geomorphology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135
ESCI 425 Glacial and Quaternary Geology, 3 Credits, Prerequisites: ESCI 121/125 or 131/135
ESCI 431 Hydrogeology, 4 Credits
ESCI 450 Environmental and Engineering Geology, 3 Credits, Prerequisites: ESCI 121/125 or 131/135
ESCI 490 Topics in Geological Sciences – Environmental Geochemistry
BIO 132 Introduction to Ecology
BIO 434 Ecology of Inland Waters
BIO 438 Aquatic Pollution
GEOG 378 Geographic Information Systems, 3 Credits

Related Requirements (16 Credits)

CHEM 161 General Chemistry, 3 Credits
CHEM 162 General Chemistry Lab, 1 Credit
CHEM 201 Foundations of Analytical Chemistry Laboratory, 1 Credits

CHEM 260 Foundations of Inorganic Chemistry, 3 Credits
PHYS 125 University Physics I, 4 Credits
PHYS 126 University Physics II, 4 Credits

The following flow chart shows the ideal pathway for a student to progress through the program. However, most of our majors decide to declare the major in their sophomore, junior, or occasionally senior year. We occasionally have students just do the major after graduating with a BS at another school. Therefore, the pathway is rarely followed, and serves only as a guideline.



Earth Science BSED

The following courses are required for the major:

GEOLOGICAL SCIENCES Core (26-28 credits)

ESCI 121 The Dynamic Earth OR ESCI 131 Environmental Geoscience, 3 Credits
ESCI 125 The Dynamic Earth Lab OR ESCI 135 Environmental Geoscience Lab, 1 Credit
ESCI 141 Earth and Life History, 3 Credits
ESCI 145 Earth and Life History Lab, 1 Credit
ESCI 129 Introduction to Meteorology 4 Credits
AST 208 Planetary Astronomy
AST 209 Stellar and Galactic Astronomy, 4 Credits
ESCI 221 Mineralogy, 4 Credits, Prerequisites: ESCI 121/125 or 131/135, CHEM 161/162
Methods Class

ESCI 290 Field Methods, 2 Credits, Prerequisites: ESCI 121/125 or 131/135 or 141/145
OR
AST 278 Observational Astronomy, 4 Credits

Focus Areas (4-6 Credits from one of the following focus areas))

Astronomy and Planetary Geology

ESCI 322 Petrology,4 Credits, Prerequisite: ESCI 221
ESCI 330Astrophysics, 3 credits, Prerequisites: PHYS 125
AST 378 Comparative Planetology, 3 Credits. Prerequisites: ESCI 121/131 or AST 208
ESCI 424 Geomorphology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135
AST 470 Extrasolar Planets and Astrobiology, 3 credits
AST 478 Planetary Image Analysis, 3 Credits, Prerequisites: PHYS 126 or permission of the instructor

Environmental Geological Sciences

ESCI 223 Stratigraphy & Sedimentology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135, 141/145
ESCI 321 Structural Geology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135, 141/145
ESCI 322 Petrology,4 Credits, Prerequisite: ESCI 221
ESCI 424 Geomorphology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135

Environmental Geological Sciences

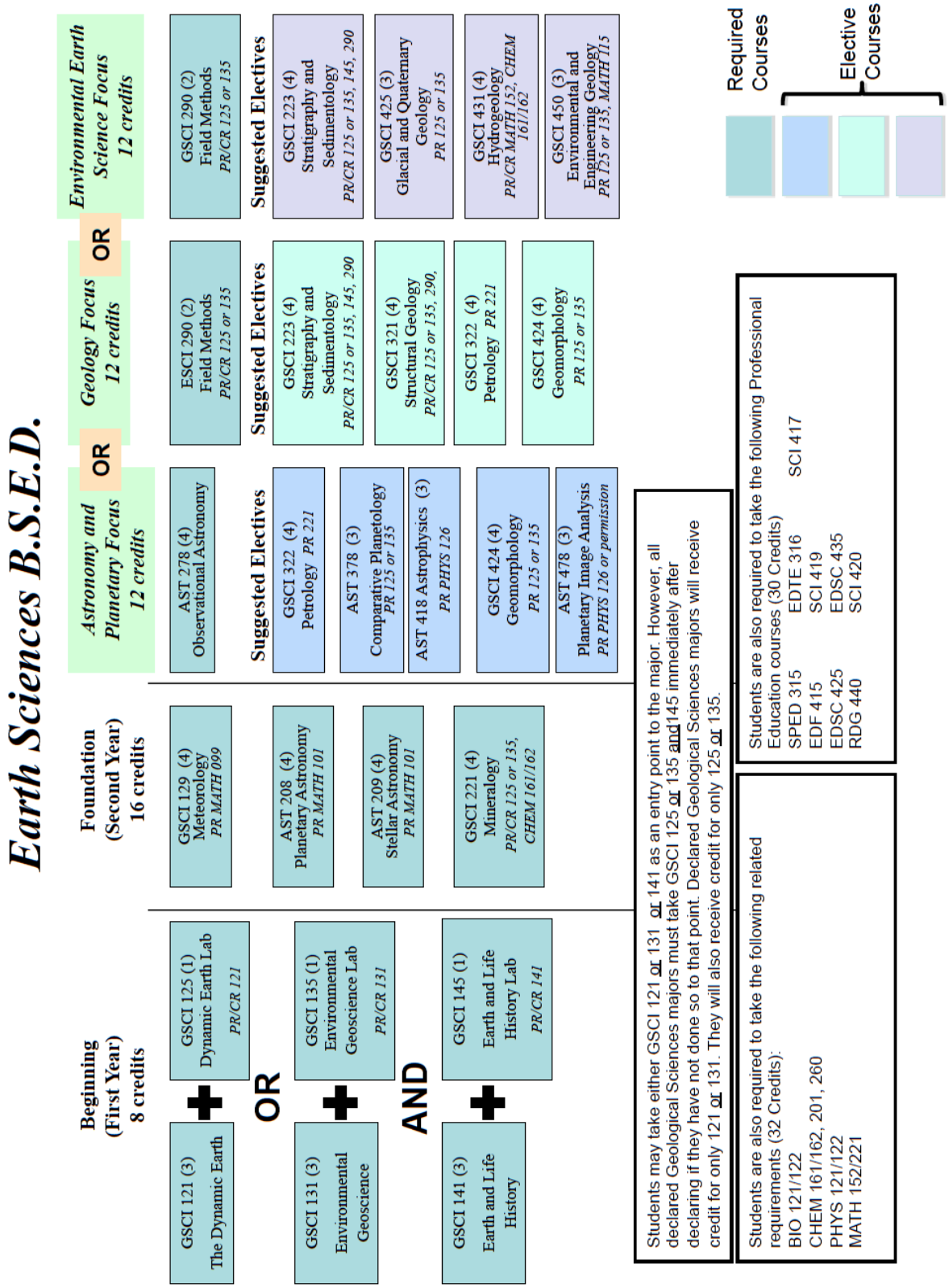
ESCI 223 Stratigraphy & Sedimentology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135, 141/145
ESCI 424 Geomorphology, 4 Credits, Prerequisites: ESCI 121/125 or 131/135
ESCI 425 Glacial and Quaternary Geology, 3 Credits, Prerequisites: ESCI 121/125 or 131/135
ESCI 431 Hydrogeology, 4 Credits
ESCI 450 Environmental and Engineering Geology, 3 Credits, Prerequisites: ESCI 121/125 or 131/135

Related Requirements (16 Credits)

CHEM 161 General Chemistry, 3 Credits
CHEM 162 General Chemistry Lab, 1 Credit
CHEM 201 Foundations of Analytical Chemistry Laboratory, 1 Credits
CHEM 260 Foundations of Inorganic Chemistry, 3 Credits
PHYS 125 University Physics I, 4 Credits

PHYS 126 University Physics II, 4 Credits

The following flow chart shows the ideal pathway for a student to progress through the program. However, most of our majors decide to declare the major in their sophomore, junior, or occasionally senior year. We occasionally have students just do the major after graduating with a BS at another school. Therefore, the pathway is rarely followed, and serves only as a guideline.



General Science: Specialization in Biology or Earth Sciences, B.S. (Certifiable for elementary education)

Requirements

Core

Total Credit Hours: 23-27

Biology Choose one sequence (A or B)

Sequence B is required for Biology Specializations

Total Credit Hours: 6-8

Sequence A

BIO 211 Concepts in Biology 3
and
BIO 111 Introductory Biology 3
or
BIO 132 Introductory Ecology 3

Sequence B

BIO 121 General Biology I 4
and
BIO 122 General Biology II 4

Science

SCI 111 Elementary Earth-Physical Sciences 3
Total Credit Hours: 3

Physics

PHYS 111 Introductory Physics I 3
or
PHYS 121 General Physics I 4
Total Credit Hours: 3-4

Chemistry

CHEM 161 General Chemistry 3
CHEM 162 General Chemistry Laboratory 1
Total Credit Hours: 4

Earth Science

Choose one sequence below (A, B, or C)

Total Credit Hours: 7-8

Sequence A

ESCI 129 Introduction to Meteorology 4
ESCI 113 The Cosmos 3

Sequence B

ESCI 121 The Dynamic Earth 3
ESCI 125 The Dynamic Earth Laboratory 1
ESCI 141 Earth and Life History 3
ESCI 145 Earth and Life History Laboratory 1

Sequence C

ESCI 131	Environmental Geoscience	3
ESCI 135	Environmental Geoscience Laboratory	1
ESCI 141	Earth and Life History	3
ESCI 145	Earth and Life History Laboratory	1

Biology or in Earth Science Specialization:

A minimum of 18 credits in either specialization below, including 6 - 8 credits in the core of the specialization

Specialization in Biology-Core

Biology Sequence B from the core requirements is mandatory for biology concentrations.

BIO 200 Integrative Biology 4

Choose BIO electives at the 300 or 400 level - 6 to 11 credits as needed to reach 39 credits

Earth Science Specialization

For those who completed Earth Science Sequence A

ESCI 121	The Dynamic Earth	3
ESCI 125	The Dynamic Earth Laboratory	1
	or	
ESCI 131	Environmental Geoscience	3
ESCI 135	Environmental Geoscience Laboratory	1
	and	
ESCI 141	Earth and Life History	3
ESCI 145	Earth and Life History Laboratory	1

For those who completed Earth Science Sequence B or C

ESCI 129 Introduction to Meteorology 4

ESCI 208 Planetary Astronomy 4

Choose ESCI electives at the 300 or 400 level - 3 credits as needed to reach 39 credits

Appendix IV: Geological Sciences Undergraduate Minor Degree Programs

Astrobiology Minor

Designed for majors in Biology, Biomolecular Science, Chemistry, Earth Science, or Physics.

Requirements: (18 credits)

Core Courses:

ESCI 208	Planetary Astronomy	4
	and	
BIO 121	General Biology I	4
	or	
BMS 102	Introduction to Biomolecular Science	3
	and	
BMS 103	Introduction to Biomolecular Science Laboratory	1

The remaining 7 credits will be selected from the following pre-approved electives or other electives as approved by an advisor in the minor:

BIO 200	Integrative Biology	4
BIO 230	Natural History	3
BIO 315	Microbial Ecology	4
BIO 405	Ecology	4
BIO 440	Evolution	3
BMS 201	Principles of Cell and Molecular Biology	4
BMS 316	Microbiology	4
CHEM 210	Foundations of Organic Chemistry	3
CHEM 211	Foundations of Organic Chemistry Laboratory	1
CHEM 212	Organic Synthesis	3
CHEM 213	Organic Synthesis Laboratory	1
ESCI 209	Stellar and Galactic Astronomy	4
ESCI 378	Comparative Planetology	3
ESCI 478	Planetary Image Analysis	3

Capstone: ESCI 470 Extrasolar Planets and Astrobiology (3)

Note that some electives have additional prerequisites.
In addition, students must take CHEM 161 General Chemistry, CHEM 162 General Chemistry Lab and CHEM 201. Foundations of Analytical Chemistry Lab, and either CHEM 200 Foundations of Analytical Chemistry or CHEM 260 Foundations of Inorganic Chemistry. (all required by majors listed above.)
Since students cannot double-count specific courses for a major and minor, Biology, BMS, and ESCI majors may take additional electives in lieu of designated core courses.

Astronomy Minor

Requirements

18 credits in Astronomy and related fields, including:

ESCI 208 Planetary Astronomy 4

ESCI 209 Stellar and Galactic Astronomy 4

In addition, students must take:

MATH 152 Calculus I 4

MATH 221 Calculus II 4

PHYS 125 University Physics I 4

PHYS 126 University Physics II 4

The remaining course will be selected from ESCI 278, ESCI 378, ESCI 418, ESCI 470, ESCI 478, or other electives after consultation with an earth sciences department advisor.

Earth Sciences Minor

Requirements

Required Courses

ESCI 121 The Dynamic Earth 3

or

ESCI 131 Environmental Geoscience 3

ESCI 125 The Dynamic Earth Laboratory 1

or

ESCI 135 Environmental Geoscience Laboratory 1

ESCI 129 Introduction to Meteorology 4

ESCI 208 Planetary Astronomy 4

or

ESCI 209 Stellar and Galactic Astronomy 4

The remaining credits will be chosen after consultation with an Earth Sciences advisor.
Total Credit Hours: 18

Earth Sciences Minor (Certifiable for secondary teaching)

Required Courses

ESCI 121	The Dynamic Earth	3
	or	
ESCI 131	Environmental Geoscience	3
ESCI 125	The Dynamic Earth Laboratory	1
	or	
ESCI 135	Environmental Geoscience Laboratory	1
ESCI 141	Earth and Life History	3
ESCI 145	Earth and Life History Laboratory	1
ESCI 129	Introduction to Meteorology	4
ESCI 208	Planetary Astronomy	4
ESCI 209	Stellar and Galactic Astronomy	4

In addition, students must take:

SCI 416	Educational Technology in Secondary Science	1
SCI 417	Teaching of Science in the Secondary School	4
SCI 419	Student Teaching Seminar	1
MATH 152	Calculus I	4
MATH 221	Calculus II	4
PHYS 121	General Physics I	4
PHYS 122	General Physics II	4

Geology Minor

Requirements

Required Courses

ESCI 121	The Dynamic Earth	3
	or	
ESCI 131	Environmental Geoscience	3
ESCI 125	The Dynamic Earth Laboratory	1
	or	
ESCI 135	Environmental Geoscience Laboratory	1
ESCI 221	Mineralogy	4
ESCI 321	Structural Geology	4
ESCI 290	Field Methods in Geology	2

and one course from the following:

ESCI 223	Stratigraphy and Sedimentology	4
ESCI 321	Structural Geology	4

ESCI 424 Geomorphology 4

Science Minor

Requirements

12 credits as follows:

BIO 121	General Biology I	4
	or	
BMS 102	Introduction to Biomolecular Science	3
BMS 103	Introduction to Biomolecular Science Laboratory	1
CHEM 161	General Chemistry	3
CHEM 162	General Chemistry Laboratory	1

4 credits from the following:

ESCI 121	The Dynamic Earth	3
PHYS 121	General Physics I	4
PHYS 125	University Physics I	4
	Total Credit Hours:	12

and 12 credits from the following:

BIO 122	General Biology II	4
	or	
BMS 201	Principles of Cell and Molecular Biology	4
CHEM 200	Foundations of Analytical Chemistry	3
	or	
CHEM 260	Foundations of Inorganic Chemistry	3
	and	
CHEM 201	Foundations of Analytical Chemistry Laboratory	1
PHYS 122	General Physics II	4
	or	
PHYS 126	University Physics II	4
	Total Credit Hours:	12

Students must take at least one course in each discipline (biology or biomolecular sciences, chemistry, and physics), and the 8 credits in the minor may be credited toward a major as well.

Appendix V: Department of Geological Sciences Course Descriptions

Note that the following reflects course designators that have changed for the Fall 2015 Semester and forward. Courses numbered 100-299 are lower division undergraduate; 300-499 are upper division undergraduate; 500 and above are graduate level. A limited number of 400-level courses are eligible for graduate students to earn graduate credit, as noted in the course description and must be approved on the student's Planned Program of Study.

Undergraduate Courses

ESCI 100 Search in Earth Science
Examination of various topics, contemporary issues and problems in earth sciences. Three hours of lecture per week. Cannot be used to meet requirements for majors or minors in earth science. No credit given to students having take ESCI 100 with the same topic. Course may be repeated one time with a different topic.
Credits 3

ESCI 102 Earth and the Human Environment
Topics in geology, meteorology, and astronomy with an emphasis on the relationships and interconnectedness between the natural environment and human activity. May not be applied to a major or minor in Earth Sciences.
Credits 3

ESCI 112 Search for Life on Other Planets
Exploration of the solar system and beyond, using introductory concepts in astronomy, biology, and geology to examine natural phenomena and address scientific questions about the possibilities of life outside Earth. May not be applied to a major or minor in Earth Sciences.
Credits 3

ESCI 113 The Cosmos
Topics in modern astronomy with an emphasis on the process of scientific discovery and the scale and evolution of the universe. May not be applied to a major or minor in Earth Sciences.
Credits 3

ESCI 121 The Dynamic Earth
Basic concepts of geology and the dynamic processes operating on and within the earth and how those processes can impact humans. Topics include formation of rocks, erosion and landscape evolution, plate tectonics, an interpretation of earth processes from geological data. Volcanic, earthquake, flooding, coastal erosion and landslide hazards and glaciation are also covered. No credit given to students with credit for ESCI 131.
Credits 3

ESCI 125 The Dynamic Earth Laboratory
Laboratory investigations into geology and the dynamic processes operating on and within the earth and how those processes can impact humans. Topics include minerals and rocks, erosion and landscape evolution, plate tectonics, an interpretation of earth processes from geological data. Volcanic, earthquake, flooding, coastal erosion and landslide hazards and glaciation. No credit given to students with credit for ESCI 135.
Credits 1
Prerequisites ESCI 131 (may be taken concurrently).

ESCI 129 Introduction to Meteorology
Introductory course dealing with atmospheric composition, structure, and basic motions. The nature of high and low pressure systems, severe weather, how the National Weather Service works. Three lectures and one two-hour laboratory per week.
Credits 4

ESCI 131 Environmental Geoscience
Investigation of Earth environmental systems including streams, lakes, estuaries, coastal, groundwater, and the physical ocean, as well as the impact of humans on those environments. Topics will also include material and energy resources, waste disposal, and climate change. No credit given to students with credit for ESCI 121.
Credits 3

ESCI 135 Environmental Geoscience Laboratory
Laboratory investigations of Earth environmental systems including streams, lakes, estuaries, coastal, groundwater, and the physical ocean, as well as the impact of humans on those environments. Topics will also include material and energy resources, waster disposal, and climate change. No credit given to students with credit for ESCI 125.
Credits 1
Prerequisites ESCI 131 (may be taken concurrently).

ESCI 141 Earth and Life History
Introduction to the principles and interpretation of Earth history, emphasizing the evolution of the lithosphere, atmosphere, and biosphere through geologic time. Emphasis will be made on the historical aspects of plate tectonics, the geologic development of North America, and important events in biological evolution.
Credits 3

ESCI 145 Earth and Life History Laboratory
Optional laboratory to accompany ESCI 141 Earth and Life History. Topics of lab exercises will include common minerals and rocks, especially sedimentary rocks and depositional environments, relative time, rock and fossil stratigraphy, radiometric dating techniques, stratigraphic sequences, geologic maps and cross sections, fossils, paleoecology, and evolution. Required for Earth Science majors. One three-hour laboratory per week.
Credits 1
Prerequisites ESCI 141(may be taken concurrently).

ESCI 208 Planetary Astronomy
Study of the bodies of the solar system, their motions, compositions, and evolution. Topics will include physical laws of motion and radiation, comparison of the surfaces, atmospheres, and interiors of solar system objects, and the formation of the solar system. Three lectures and one two-hour laboratory per week.
Credits 4

ESCI 209 Stellar and Galactic Astronomy
Study of stars and galaxies as separate bodies and members of clusters. Topics will include astrophysical properties of stars and galaxies, stellar and galactic evolution, and cosmology. Emphasis will be placed on observational and experimental methods astronomers use to study the universe. Three lectures and one two-hour laboratory per week.
Credits 4

ESCI 221 Mineralogy
Study of minerals, their formation, occurrence, properties, composition, and classification. Topics include crystal chemistry, internal crystal structures, optical and other physical properties, identification of crystal forms and mineral specimens, and an introduction to petrology. Three lectures and one three-hour laboratory per week. One or more one-day field trips.
Credits 4
Prerequisites ESCI 125 or ESCI 135, CHEM 161 AND 162.

ESCI 223 Stratigraphy and Sedimentology
Study of the processes and patterns of sedimentation as well as the spatial and temporal distribution of strata. Both ancient and modern depositional environments will be investigated. Three, one-hour lectures; one, three-hour lab; and one or more one-day field trips.
Credits 4
Prerequisites ESCI 145, 290.

ESCI 278 Observational Astronomy
Theory and practice of observational astronomy. Topics include solar and lunar observation, naked eye observation, and coordinate systems, telescope usage and design. Two lectures and two two-hour labs per week.
Credits 4

ESCI 290 Field Methods in Geology
Methods and equipment used in field geology, including use of a Brunton compass, outcrop description and sketching, basic mapping techniques, sampling methods, notebook maintenance, use of global positioning system (GPS) technology, geologic maps and cross sections, field safety, and report writing. One, tree-hour lab per week. Lab sessions will typically involve outdoor activities. Two or more half-day field trips required.
Credits 2
Prerequisites ESCI 125 or 135.

ESCI 321 Structural Geology
Study of the geometry and origin or rock structures that are products of earth deformation. These include folds and faults, as well as microstructures. Emphasis will be placed on recognition and interpretation of structures through field and laboratory studies. Three lectures and one three-hour laboratory per week. One or more one-day field trips are required.
Credits **4**
Prerequisites ESCI 125 or 135, 290 (may be taken concurrently).

ESCI 322 Igneous and Metamorphic Petrology
Study of igneous and metamorphic processes and environmentals of formation. Application of chemical principles to the origin of igneous and metamorphic rocks. Identification and petrographic analysis of rocks will be emphasized in the laboratory. One or more one-day field trips.
Credits 4
Prerequisites ESCI 145 and ESCI 221.

ESCI 335 Physical Oceanography
Introduction to physical properties and chemical composition of seawater, ocean currents and ocean circulation, and the physical characteristics of the seafloor. Also covered is the interrelationship of the ocean with atmospheric circulation and world climate. Three lectures per week.
Credits 3
Prerequisites CHEM 161 and 162, and PHYS 121.

ESCI 360 Research Methods in the Earth Sciences
Investigation of the process of research, from the scientific method through writing a scientific proposal. Research results presented by written report, oral or poster presentation.
Credits 1
Prerequisites Junior standing and Earth Science major.**will be changed to sophomore standing in spring 2015.*

ESCI 378 Comparative Planetology
Study of the surfaces, interiors, and atmospheres of objects in the solar system with the goal of better understanding the formation and evolution of planetary bodies both similar to and different from the Earth.
Credits 3
Prerequisites ESCI 121 or 131 or 208.

ESCI 418 Astrophysics
Astrophysics of stars and galaxies, including stellar structure, nucleosynthesis and evolution, galactic structure and evolution, and relativistic cosmology.
Credits 3
Prerequisites MATH 221 and PHYS 126; or permission of department chair.

ESCI 424 Geomorphology

Scientific study of landforms on the earth's surface. A systematic analysis of a wide variety of landforms, with an emphasis on the processes that form them. Tectonic and climate controls of geomorphic systems are considered as are the impacts of human activities. Three, one-hour lectures, and one three-hour laboratory per week. One or more one-day field trips.
Credits 4
Prerequisites ESCI 125 or 135; for graduate students permission of department chair.

ESCI 425 Glacial and Quaternary Geology
Examination of the role of glaciers in Earth's climate system with a focus on the Quaternary period; the mechanics of glaciers and their role in large-scale geomorphic change; and the characteristics of the Pleistocene glacial deposits of southern New England. One or more one-day field trips.
Credits 3
Prerequisites ESCI 125 or 135.

ESCI 431 Introduction to Hydrogeology
Overview of hydrologic and hydrological factors controlling the occurrences and dynamics of groundwater. Groundwater chemistry, quality, and contamination will also be covered. Three lectures and one three-hour laboratory per week. One or more one-day field trips.
Credits 4
Prerequisites ESCI 125 or 135, CHEM 161 and 162; MATH 152 (may be taken concurrently) or permission of department chair.

ESCI 450 Environmental and Engineering Geology
Geological factors that control or affect human habitat avoiding, or compensating for geological hazards. Applied geology from an environmental perspective that focuses on interactions between humans and Earth surface processes. Study of natural hazards such as river flooding, landslides and debris flows, earthquakes, volcanic eruptions, coastal hazards. Surface and ground water use and pollution are also covered.
Credits 3
Prerequisites ESCI 125 or 135, MATH 115 or 119, or permission of department chair.

ESCI 452 Independent Study in Geological Sciences
Special work in laboratory, theory, or research to meet individual requirements in areas not covered by regular curriculum. May be taken more than one semester up to 6 credits.
Credits 1 TO 4
Prerequisites Approved plan of study on arrangement with supervising instructor and approval of department chair.

ESCI 460 Senior Project
Investigation of a topic of current research interest as determined by the student in consultation with the faculty. Research technique, critical data evaluation, specialized knowledge, independence and originality are cultivated as the project develops. Written report and presentation are required. The Senior Project may span only one semester earning one to three credits, or two separate semesters for a maximum of six credits.
Credits 1 TO 3
Prerequisites ESCI 360, senior standing as an earth science major, and written permission of both project advisor and department chair.

ESCI 470 Extrasolar Planets and Astrobiology
Exploration of the processes related to planet formation and evolution and the planetary conditions required for the emergence of life, as well as the astronomical techniques used to detect extrasolar planets, discern their properties (include potential habitability), and collect statistics on their occurrence in the universe.
Credits 3
Prerequisites ESCI 208, and BIO 121 or BMS 102/103; or permission of department chair.

ESCI 478 Planetary Image Analysis
Theory and application of image analysis to determine the geologic history of solar system objects through examination of surface morphology and mineralogy as observed in multi- and hyperspectral datasets.

Credits 3
Prerequisites PHYS 126 or permission of department chair.

ESCI 480 Internship in Geological Sciences
Students serving in the program will serve as interns, obtaining outside industrial and/or research experiences in an environment directly related to their specialization. Internship[s may be in any area of astronomy, earth science, geology, meteorology, or planetary science. Projects will be supervised by one or more department members. Written report or poster presentation required.
Credits 1 TO 3
Prerequisites Senior standing and permission of the student's advisor.

ESCI 490 Topics in Geological Sciences
Selected studies in earth science which are not offered presently in the curriculum of the department. Course may be repeated with different topics.
Credits 3 TO 4

ISCI 118 Women's Contributions to Science
Exploration of discoveries made by women scientists, including their methodology, consequences, and the social constraints placed upon them. Two lectures and one, two-hour laboratory period per week.
Credits 3
Prerequisites MATH 099 or permission of instructor.

Graduate Courses*

***the MS Natural Science program is on hold, and is currently not accepting new students. These courses are not offered.**

ESCI 518 Topics in Astronomy
Topics will vary each time course is offered. Combination of lecture, discussion, and student seminar presentations. May be taken more than once for credit under different topics.
Credits 3

ESCI 519 Topics in Geology
Topics will vary each time course is offered. Combination of lecture, discussion, and student seminar presentations. May be taken more than once for credit under different topics.
Credits 3

ESCI 598 Research in Earth Science
Course on theory and practice of conducting research in astronomy, geology, meteorology. Includes study of professional literature, evaluation of data-gathering techniques. Application of statistical methods to data; formation of multiple working hypotheses and verification of hypotheses. Classic problems in earth sciences are studied.
Credits 3

ESCI 599 Thesis
Preparation of the thesis under the supervision of the thesis advisor.
Credits 3

The following courses are offered through the Science Education Programs

Undergraduate Courses

SCI 111 Elementary Earth-Physical Sciences
Inquiry-based introduction to topics in earth and physical sciences contained within the Connecticut State Science elementary standards.
Credits 3

SCI 412 Elementary Science Methods

Subject matter majors with complementary area of earth science are exempt from SCI 111. Methods of science instruction and assessment using developmentally appropriate activities. Introduction to science curriculum, the National Science Standards, and the State of Connecticut Frameworks. Not open to Summer participants without permission of instructor. CT law requires fingerprinting and a criminal background check for the field experiences in this class. Fingerprinting must be completed prior to the beginning of class.
Credits 2

SCI 417 Teaching of Science in the Secondary School
Taken concurrently with ESC 425. Examination and application of curriculum, instruction, and assessment strategies in line with national and state standards/frameworks and CSDE certification requirements, including the BEST program and science teaching portfolio development. CT law requires fingerprinting and a criminal background check for the field experiences in this class. Fingerprinting must be completed prior to the beginning of class. Thirty hours of content area major field experience is required for teacher candidates.
Credits 4
Prerequisites EDTE 316, Admission to the Professional in Teacher Education.

SCI 419 Student Teaching Seminar
Discussion, reflection, and collaboration with peers on issues that arise in secondary science education in the areas of curriculum, instruction, classroom management, and student assessment.
Credits 1
Prerequisites SCI 417 (EDSC 435 taken concurrently).

SCI 420 History and Nature of Science
Study of the history and nature of science. Examination of scientist's lives and discoveries through a cultural, political, and economic lens; and how science distinguishes itself from other disciplines' ways of knowing the world by examining contemporary assumptions, issues, and values of science. A safety plan based on state and national recommendations for implementation in the classroom will be required.
Credits 3
Prerequisites Junior Standing or permission by instructor.

SCI 452 Independent Study in Science
Includes special work in the laboratory or study of theory to meet the individual requirements in areas not covered by the regular curriculum. May be taken for more than one semester up to a limit of 6 credits.
Credits 1 TO 6
Prerequisites Approved plan of study by arrangement with the supervising instructor and approval of the science department chair.

SCI 453 Environmental Interpretation Internship
Responsible experiences in an environmental education facility. Before commencing the internship, a plan of the internship must be approved by the Advisory Committee on Environmental Interpretation.
Credits 3
Prerequisites Prior completion of two field trips to environmental education facilities approved by advisory committee and senior standing.

SCI 456 Teaching Science to Young Children
Develops teaching strategies which assist young children in expanding their awareness, understanding, and appreciation of their natural environment. Teachers will learn active involvement techniques and will prepare hands-on science curriculum materials for use with children from preschool through grade 3.
Credits 3
Prerequisites Permission of instructor.

Graduate Courses

SCI 500 STEM in Society
Inquiry into the nature and values of current science, technology, engineering, and math (STEM) issues and their implications for society.
Credits 3

SCI 518 Teaching Science in the Out-of-Doors
Development of leadership skills and instructional techniques necessary for teaching science in the outdoor classroom. The methods and materials for developing and conducting an outdoor education program in science are discussed. Three hours a week; field studies are required.
Credits 3
Prerequisites Two science courses.

SCI 520 The Physical Sciences
Emphasis on conceptual understanding of the physical strands in the Connecticut Science Standards: Properties of Matter, Forces and Motion, and Energy Transfer and Transformations. Development of content activities, labs, and assessments for use in the classroom.
Credits 3

SCI 530 The Earth/Space Sciences
Emphasis on conceptual understanding of the Earth/Space science strands in the Connecticut Science Standards: Energy in the Earth's Systems, The Changing Earth, and Earth in the Solar System. Development of content activities, labs, and assessments for use in the classroom.
Credits 3

SCI 540 The Life Sciences
Emphasis on conceptual understanding of the life science strands in the Connecticut Science Standards: Heredity and Evolution, Structure and Function, and Matter and Energy in Ecosystems. Development of content activities, labs, and assessments for use in the classroom.
Credits 3

SCI 555 Teaching of Science in the Elementary School
Examination of science instruction and assessment strategies in line with the National Science Standards and the State of Connecticut Standards.
Credits 3
Prerequisites Permission of instructor or chair.

SCI 557 Science Instruction and Curriculum Development
Examination and application of elementary and secondary science curriculum, instruction, and assessment strategies in line with the State of Connecticut Standards.
Credits 3

SCI 570 Teaching of Science in the Secondary School
Examination of middle-level and secondary science curriculum, instruction, and assessment strategies in line with State of Connecticut science standards.
Credits 3

SCI 580 Topics in STEM Education
Science, Technology, Engineering and Math (STEM) topics will vary each time course is offered. Combination of lecture, discussion, inquiry sessions, and student presentations. May be taken more than once for credit under different topics.
Credits 3

SCI 581 Independent Study
Work in laboratory, theory, or research to meet individual requirements in areas not covered by regular curriculum. May be taken more than once for a limit of 6 total credits. Requires approved plan of study by arrangement with the supervising instructor.
Credits 1 TO 3

SCI 595 Special Projects in Science Education

Study of individual and collaborative action research techniques. Requirements include the design and completion of a classroom/school action research project and the preparation and submission of a paper for publication.
Credits 3

SCI 598 Research in Science Education
Focus on current global issues related to science education. Students examine current literature and conduct an informal research project on current issues. Requirements include preparation of a research paper.
Credits 3

SCI 599 Thesis (Science Education)
Preparation of the thesis under the supervision of the thesis advisor.
Credits 3
Prerequisites SCI 598 and admission to the M.S. program in Natural Sciences: Science Education; 21 credits in planned program; permission of advisor; and a 3.00 overall GPA.

STEM 506 Problem Based Learning in STEM Education
Study of techniques for integrating science, technology, engineering, and math (STEM) content in an engaged learning curriculum.
Credits 3
Prerequisites Admission to the M.S. in STEM program.

STEM 520 STEM Practices in the Physical Sciences
Emphasis on conceptual understanding of the physical science core concepts and technology, engineering, and mathematics (STEM) practices in the National Framework for K-12 Science Education and Standards for Technological Literacy. Development of curricular and instructional activities, labs, and assessments for use in the classroom.
Credits 3
Prerequisites Admission to the M.S. in STEM Education program, or admission to any Master's program.

STEM 530 STEM Practices in the Earth/Space Sciences
Emphasis on conceptual understanding of earth/space science core concepts and technology, engineering, and mathematics (STEM) practices in the National Framework for K-12 Science Education and Standards for Technological Literacy. Development of curricular and instructional activities, labs, and assessments for use in the classroom.
Credits 3
Prerequisites Admission to the M.S. in STEM Education program, or admission to any Master's program.

STEM 540 STEM Practices in the Life Sciences
Emphasis on conceptual understanding of life science core concepts and technology, engineering, and mathematics (STEM) practices in the National Framework for K-12 Science Education and Standards for Technological Literacy. Development of curricular and instructional activities, labs, and assessments for use in the classroom.
Prerequisites Admission to the M.S. in STEM Education program, or admission to any Master's program.

STEM 595 Action Research in STEM Education
Review of current issues and related to science, technology engineering and math (STEM). Synthesize and summarize a variety of scholarly work to provide a new interpretation of a current issue. Requirements include preparation of a research paper for publication.
Credits 3
Prerequisites Admission to the M.S. in STEM Education program, completion of 24 credits in the STEM planned program (or permission of instructor), and a 3.00 overall GPA.

STEM 598 Research in STEM Education
STEM-oriented research project that addresses immediate school-based issues or problems. Quantitative and/or qualitative methods with emphasis on reflective practices. Requirements include the preparation and submission of this scholarly work for publication. Plan E Capstone
Credits 3

Prerequisites Admission to the M.S. in STEM Education program.

Appendix VI: Senior Project Guidelines

Central Connecticut State University
Geology and Earth Science Majors

Senior Research Project Guide
Academic Year 2014-2015

INTRODUCTION

This guide is intended to aid you in planning for and completing the required senior project course (ESCI 460). Your senior project is a serious commitment, and you will need to budget your time accordingly. Interim reports and regularly scheduled meetings are required so we can provide feedback throughout the term, to help minimize the rush work at the end of the semester, and most importantly to ensure a high quality final product.

PURPOSE OF THE SENIOR PROJECT

The purpose of the senior project is to provide you with experience in independent research with assistance from a geoscience faculty member (your project advisor). These projects demonstrate to employers and graduate schools your ability to complete a major assignment, to work independently, to analyze and synthesize information, and to write and speak persuasively. Your advisor will assist you in developing a project topic and a detailed plan of study, which may include field work and/or laboratory analyses using university equipment. **You are strongly encouraged to start planning your senior project during your Junior year, particularly if you wish to undertake summer field work.**

You may complete your Senior Project requirement over one or two semesters, enrolling in 1-3 credits of ESCI 460 for each term. A minimum of 2 credits is required for the Geology B.S., a minimum 1 credit project is required for the Earth Science B.S. *Although not required, students in the Earth Science B.S.E.D. are also encouraged to complete research projects.* Your project advisor will determine the appropriate number of credits based on the amount of work required to achieve your planned project outcomes.

Students who produce projects with significant scientific results will be encouraged to present results at professional conferences and at the Undergraduate Research Day at CCSU. You will need to demonstrate significant progress on your project before the abstract deadline in order to present: make sure to plan your project accordingly (for example, the abstract deadline for the regional meeting of the Geological Society of America in the spring is in *early December*.)

PREREQUISITES

You are required to take *ESCI 360 Research in the Earth Sciences* prior to starting your senior project, and you must be of *senior standing in a Geology or Earth Science major* to enroll in ESCI 460. (Non-senior students may instead take ESCI 452). You will not be able to register for ESCI 460 online via WebCentral-BannerWeb: instead, you will need to fill out a form (available in the main office) that requires a signature from both your project advisor and the Department Chair.

GENERAL CONSIDERATIONS

One of the most important components of a successful senior project is choosing an appropriate topic. You will want to find a project that is intellectually challenging, that allows you to perform original research or contribute original work, and can be accomplished within the time constraints of your senior year. Use the Senior Project Topics Guide to help you identify a potential advisor and project, ***although you are not required to choose a project directly from the topics guide***.

One of the most common pitfalls encountered by researchers is underestimating the time required to complete different project tasks. The required weekly meetings are intended to help keep your project advisor informed of your progress so they can prevent you from falling too far behind. The final written report, in particular, often takes more time than expected: to avoid leaving this task until it is too late, you should be gathering references and working on your rough draft throughout the course of your project.

SUGGESTED TIMELINE

1) **At least one semester before** you enroll in ESCI 460, **select a project advisor and begin planning your project.** This deadline is critical for planning field work, which may completed the summer prior to signing up for the course.
2) **During the add/drop period of each semester you enroll in ESCI 460**, you must complete the Senior Project Proposal and Course Enrollment forms. You and your project advisor will schedule a weekly meeting time..
3) **By midterm of <u>each</u> semester of your project,** you must turn in a one page progress report to your advisor.
4) **On the Reading Day of <u>each</u> semester,** you will give an oral presentation on your progress to date**.**
5) **No later than the end of Finals Week,** you must turn in a written assignment to your project advisor, which may be in the form of a written report, a conference abstract, or a conference poster. <u>This deadline may be moved earlier in the semester depending on abstract deadlines and conference dates.</u>

Suggested Deadlines for the 2014-2015 Academic Year

TASK	DUE DATES: FALL 2014	DUE DATES: SPRING 2015
Complete project proposal and enrollment form	September 4, 2014	January 20, 2015
Midterm progress report	October 22, 2014	March 9, 2015
Oral Presentation	December 10, 2014	May 1-2, 2015
Summaries of 3 seminars	December 17, 2014	May 9, 2015
Written Assignment (abstract, poster, or report)	December 17, 2014 (or GSA abstract deadline)	May 9, 2015

GRADE BREAKDOWN for ONE Semester Projects

Project proposal	5%
Midterm Progress Report	10%
Summaries of 3 seminars	15% (5% each)
Oral Presentation	20%
Project Report:	50%

GRADE BREAKDOWN for TWO-Semester Projects

First Semester

Project proposal	5%
Midterm Progress Report	10%
Summaries of 3 seminars	15%
Oral Presentation	15%
Conference Abstract or Interim Report:	55%

Second Semester

Progress Summary	5%
Midterm Progress Report	10%
Summaries of 3 seminars	15%
Oral Presentation	15%
Written Report or Conference Poster:	55%

POLICY FOR LATE SUBMISSIONS

All assignments will adhere to the department late policy: late assignments will be penalized 1 letter grade (10%) per day late unless your project advisor determines that there are appropriate extenuating circumstances. ***Outside deadlines, such as those for conference abstracts and course enrollment forms, are final: you will not be able to complete these tasks late regardless of outside issues.***

Deadline extensions will be given only under exceptional circumstances (such as serious illness or family emergencies). Lost data, computer/printer problems, projects not going exactly according to plan, projects due in other classes, etc., do not qualify.

Budget your time accordingly: you must treat your project as it if were a course you were taking, and should plan to dedicate *3 hours per credit per week* to working on it.

GUIDE TO THE ASSIGNMENTS

PROJECT PROPOSAL – Must be submitted to your project advisor during the add/drop period of the first semester of your project. Your project proposal is a 300-500 word summary that clearly states the objectives of your project, the methods you will use to achieve those objectives, and what you expect will be the outcomes of your project. You will need work with your project advisor to determine appropriate goals, methods, and outcomes. When you submit your proposal, your advisor will sign your course enrollment form and schedule a time to meet with you weekly during the semester, A copy of the project proposal form is attached at the end of this document. A proposal is not required for the second term of a two semester project; this is replaced by a **PROGRESS SUMMARY** that summarizes the work you've already done and what tasks remain ahead.

COURSE ENROLLMENT FORM – Must be submitted to the University during the course add/drop period of each semester of your project. Must be signed by both your project advisor and the Department Chair.

MIDTERM PROGRESS REPORT – Due by midterm of each semester of your project, your progress report is a 1-2 page summary of your research to date, including a clear statement of the project objectives, and how you've employed your chosen methods towards achieving the project outcomes.

SEMINAR SUMMARIES – As part of your senior project, you are **required** to attend at least 3 research seminars: these may be part of the department Friday lunch seminar series or seminars at other institutions. ***Your advisor must approve the seminars you choose to attend before you may submit your summary***. Written summaries should 1-2 pages in length (single-spaced) and should summarize the content of the seminar, pose questions for the speaker, and include citations to appropriate references.

ORAL PRESENTATION – All students enrolled in ESCI 460 will make a 10-15 minute PowerPoint presentations on their progress (whether their project is complete or not) on the Reading Day of each term. These presentations will be open to anyone interested.

PROJECT REPORT – Written project reports must be 7-10 pages of **text NOT including title page, figures, or references**, typed in a commonly used 12 point font (e.g., Time Roman), double spaced, and with 1 inch margins. Your report should follow standard scientific paper format: abstract (250 words max.), introduction, background, results, discussion, and summary/conclusions; it may also include additional materials in appendices, including maps, photographs, extensive graphs/data tables, and/or sketches.

Your report must include appropriate text citations with a list of references in GSA format. You should be familiar with what material must be referenced and the proper format from ESCI 360 (Research Methods): be sure to consult with your project advisor if you have any questions.

PROFESSIONAL MEETING PRESENTATION

If your project results are significant, your project advisor will encourage you to present the results of your project at a professional meeting (e.g., regional Geological Society of America Meeting). Although this is not required for any senior project, a conference presentation allows you get feedback on your project from the general geoscience community, and will give you the opportunity to meet professionals who could provide good leads for jobs or entry into graduate school.

Appendix VII: Geological Sciences Opportunities for Student Field Experience

Fall semester: (*every other year)

- ESCI 121/125 Dynamic Earth field trip in central Connecticut (service to 18-24 students)
- ESCI 141/145 Earth and Life History field trip in central Connecticut (service to 18-24 students)
- ESCI 290 Field Methods field trip to Simsbury, CT (service to 10-16 students)
- ESCI 290 Field Methods field trip to Manchester, CT (service to 10-16 students)
- ESCI 290 Field Methods field trip to Farmington, CT area (service to 10-16 students)
- ESCI 290 Field Methods field trip to Higganum, CT (service to 10-16 students)
- ESCI 321 Structural Geology field Trip to Gillette Castle State Park (service to 10-16 students)
- ESCI 321 Structural Geology field trip to Simsbury, CT (service to 10-16 students)
- ESCI 321 Structural Geology field trip to Beavertail Point, RI (service to 10-16 students)
- Department field trip for Northeastern Intercollegiate Geological Conference (service to 6-12 students)
- *ESCI 425 Glacial and Quaternary Geology field trip to Bristol, Farmington, South Windsor and Cromwell, CT (service to 10-16 students)
- *ESCI 425 Glacial and Quaternary Geology field trip to southern and eastern CT (service to 10-16 students)

Spring semester (*every other year)

- ESCI 121/125 Dynamic Earth field trip in central Connecticut (service to 18-24 students)
- ESCI 141/145 Earth and Life History field trip in central Connecticut (service to 18-24 students)
- ESCI 223 Stratigraphy and Sedimentology field trip to Hammonasset Beach, CT (service to 10-16 students)
- ESCI 223 Stratigraphy and Sedimentology field trip to East Berlin, CT (service to 10-16 students)
- ESCI 223 Stratigraphy and Sedimentology field trip to Manchester, CT area (service to 10-16 students)
- ESCI 223 Stratigraphy and Sedimentology field trip to eastern New York – Two days (service to 10-16 students)
- ESCI 424 Geomorphology field trip to central CT (service to 10-16 students)
- *ESCI 322 Petrology field trip to Cape Anne, MA (service to 10-16 students)
- *ESCI 322 Petrology field trip to NH and VT – Two days (service to 10-16 students)
- *ESCI 322 Petrology field trip to central CT (service to 10-16 students)
- Department trip to take students to the northeast section meeting of the Geological Society of America in an eastern city, Baltimore, Pittsburgh, Portland, etc. (service to 15-22 students)
- *ESCI 431 Hydrogeology field trip to UConn well field (service to 15-20 students)

Appendix VIII: Problems associated with Obtaining Vans from the Connecticut State Motor Pool in Wethersfield, CT.

i. Cost of field trips

Currently, the Department of Geological Sciences pays for student field trips from its operating expenses (OE). Prior to 2013-2014, most trips were run using private vehicles because of 1) the difficulty in obtaining vans (see below), 2) cost of van rental, and 3) lack of prior planning. Since 2013, we have made a consciences effort to obtain vans for all field trips. We feel that this is a good way to make University administration aware of our needs. However, we pay a significant price in time for this effort (see below). The cost is also an issue. Since we typically rent two vans per weekend (4 -5 days because of pick-up and drop off issues) the cost is up to $1020 for six van rentals per semester, significantly more if state vehicles are not available. For two semesters, this is nearly 15% of our OE. We have no other funding available for class trips. For extracurricular trips, we have been fortunate to have the student government pick up van costs through the Geology and Planetary Science Club. However, this source of funding is not always predictable from year to year.

ii. Problems with the Current Arrangement to Obtain Vans

Currently, when a faculty member wants to take students in the field as part of a class, the procedure is:
1) The faculty member puts in for a travel authorization (ideally two weeks before travel)
2) The faculty member requests the Department Chair order 12-passenger vans from Motor Pool. The vans cost $34 per day.
3) The Chair fills out the appropriate Motor Pool request form and has it faxed to the police office.
4) Depending on when the assigned officer (who is part-time) works, it may take 2-3 days for the officer to call over to Motor Pool to see if vans are available for the dates requested.
5) If vans are available, then the Chair is notified as such, and the Chair in turn notifies the faculty member.
6) The vans are then picked up with the procedure outlined below.
7) If no vans are available, the Chair must fill out an Enterprise rental request form and fax it to the police department.
8) At some point (within a day or two), the Chair is then notified that it is ok to call Enterprise and arrange Minivan rentals
9) The Chair then calls Enterprise to see if minivans are available. If they are, the Chair then arranges for rental. Enterprise does not have 12-passerger vans, only 7-passenger minivans. Since Geological Sciences typically has15-20 students in their classes, they need to rent 3 minivans as opposed to two 12-passenger vans from motor pool. This is much more expensive as minivans rental is at least $42 per day with the CCSU discount.
In addition, on a typical rental Geological Sciences needs to have at least 3-4 and sometimes 5-6 drivers per weekend because we run multiple trips for multiple classes.

- For each additional driver Enterprise charges $10 per day per vehicle. So, if we have three drivers for each of two minivans, that is $20 per day (two extra drivers) for a four-day rental (Thursday through Monday morning). That is an extra charge to our Department of $160 on top of van rental. For three vans, it could be as high as $200 extra for the weekend. State vans have no limit on the number of drivers listed.
- If we do not have a faculty member (besides the trip leader) to go on the field trip, and we have no students in class that are 25 years old or older, then we cannot rent a second van. Enterprise does not allow people under 25 to drive a minivan. The trip must then be cancelled or the students need to carpool.

10) If no minivans are available through Enterprise, then the Chair notifies the faculty member, and the faculty member cancels the field trip, moves the date (and hopes that vans are available), or asks the students to car pool. If the trip is cancelled, the students lose that opportunity to learn. Also, if the trip is

cancelled, students who have arranged time off of work for the field trip (usually done weeks in advance) typically cannot get their hours back and lose that money.

iIi. Time and Effort Required to Pick Up Vans from Motor Pool in Wethersfield.
Because of class size, Geological Sciences and Biology typically needs to obtain one or two 12-passenger vans from Motor Pool. The procedure to obtain the vans is excessively time consuming.

> 1) Motor Pool hours are M-F 8:00am – 4:00pm. For a day field trip, the van(s) must be picked up after 8am and dropped off before 4pm. For a Friday, Saturday, and or Sunday field trip, vans must be picked up on Thursday before 3:30PM, then returned on Monday morning.
> 2) This is a catch-22 situation. If one or two faculty members drive to motor pool to pick up one or two vans, they must leave their personal cars at motor pool. Since the van rental is over the weekend, the faculty members cannot obtain their cars when the trip(s) are over because the motor pool gate is locked over the weekend. Since the faculty members no longer has a vehicle as their personal disposal (state vehicles cannot be used for personal use), they need to arrange rides home, and will be without a vehicle for remainder of the weekend. Then the faculty member needs to arrange a ride back to CCSU. Alternatively, the faculty members need to arrange transportation to/from motor pool with another faculty member. If two vans are needed, this necessitates the coordination of three faculty teaching schedules.

For example: *To get and return two vans*:

Although we occasionally use student drivers, faculty typically drive. So, three faculty need to drive to/from motor pool, this takes one hour round trip with typical mid-day traffic. Assuming that average faculty salary is $60/hr with benefits, this costs the University $360 to go to/from motor pool to pick up and return vans. This does not account for the lost productivity of six hours that could be spent with students, preparing classes, doing committee work, etc.

For example: *To get and return one van for a one-day field trip:*

If our faculty would want to run a trip during the week, the faculty member in charge must drive to Wethersfield, pick up the van, drive back to campus (one hour round trip), run the field trip for class, drive back to Wethersfield to drop off the van, and drive back to campus (one hour round trip), all within an 8 hour time frame. Assuming that average faculty salary is $60/hr with benefits, this costs the University $120 to go to/from motor pool to pick up and return vans. Except for running the field trip, that faculty member cannot accomplish anything else that day, especially working with students, preparing classes, doing committee work, etc.

In addition, personal vehicle costs include $8 of mileage on their personal vehicle (at the 0.5 reimbursement rate for mileage on a personal vehicle) to collect and return a single vehicle. This cost is usually out-of-pocket for the faculty member. So, for each trip to obtain one van is $128, and for two vans, the cost is $368. Geological Sciences uses two vehicles five-six weekends per semester (see Appendix ___). This comes to $1840-$2208 per semester 'cost to the University' along with 30-36 'lost' faculty hours. Biology uses one to two vehicles for at least 8 weeks per semester. This comes to $2944-$5888 per semester, along with 16-32 'lost' faculty hours per semester.

In summary, besides the actual cost of van rental (at least $34 per van per day), the cost of obtaining and returning vans in terms of faculty time for 'just' Geological Sciences and Biology, is $4784-$8096 per semester. In addition, there are 46-68 'lost' faculty hours.

None of the above 'costs' would be incurred if vans were available on campus.

Appendix IX: Floor Plan of Geological Sciences Space on the Fifth Floor of Copernicus Hall

Appendix X: Geological Sciences Lecture and Labs taught on the Fifth Floor of Copernicus Hall

Geological Sciences Lectures and Labs taught on the 5th floor.
ESCI 125 Dynamic Earth Lab (2 sections per semester)
ESCI 129 Meteorology Lab (2 sections per semester)
ESCI 135 Environmental Geoscience Lab (2 sections per semester)
ESCI 145 Earth and Life History Lab (2 sections per semester)
ESCI 208 Planetary Astronomy Lab (2 sections fall)
ESCI 209 Stellar and Galactic Astronomy Lab (2 sections spring)
ESCI 221 Mineralogy Lecture and ESCI 221 Mineralogy Lab (1-2 sections fall)
ESCI 223 Stratigraphy and Sedimentology Lecture and ESCI 223 Stratigraphy and Sedimentology Lab (1 section spring)
ESCI 278 Observational Astronomy lab (1 section fall)
ESCI 290 Field Methods Lab (1 section fall)
ESCI 321 Structural Geology Lecture and ESCI 321 Structural Geology Lab (1 section fall)
ESCI 322 Petrology Lecture and ESCI 322 Petrology Lab (1 section spring E)
ESCI 330 Astrophysics (1 section fall O)
ESCI 360 Research and Report Writing (1 section spring)
ESCI 378 Comparative Planetology (1 section spring O)
ESCI 424 Geomorphology Lecture and ESCI 424 Geomorphology Lab (1 section spring)
ESCI 425 Glacial and Quaternary Geology Lecture (1 section fall O)
ESCI 431 Hydrogeology Lecture and ESCI 431 Hydrogeology lab (1 section spring O)
ESCI 450 Environmental and Engineering Geology Lecture (1 section Spring E)
ESCI 478 Planetary Image Analysis (1 section Spring E)
ESCI 460 Senior Project, ESCI 452 Independent Study, and general student research (8-10 students per semester work on independent research projects) (every semester)
ESCI 490 Environmental Geochemistry (1 section Fall E)
ESCI 433 Soils and Soil Science (anticipated new course)
ESCI 365 Geological Applications of GIS (anticipated new course)

ISCI 218 Women's Contribution to Science (1 section Fall O)

Science Education Lectures and Labs taught on the 5th floor.
SCI 111 Elementary Science (1-2 sections per semester)
SCI 412 Elementary Methods in Science Education (3-4 sections per semester)
SCI 417 Teaching Science for Secondary Education (1 section per semester)
SCI 419 Student Teaching Seminar (1 section per semester)
SCI 420 History of Science (1 section Spring E)
SCI 500 Science, Technology and Society (1 section Fall O)
SCI 518 Teaching Science in the Out of Doors (1 section Fall O)
SCI 520 Teaching the Physical Sciences (1 section Spring O)
SCI 530 Teaching Earth Science (1 section Spring E)
SCI 540 Teaching Life Science (1 section Fall E)
SCI 595 Special Projects (1 section Spring E)
SCI 598 Research (1 section Spring O)

Appendix XI: CCSU Geological Sciences Department Equipment Inventory

1. Equipment for the Geological Sciences
1.1 Microscopes and related equipment
16 Leicia DM-EP binocular Petrographic microscopes with accessory plates
1 Leicia DM-EP trinocular Petrographic microscope with accessory plates, Leica DMC 2900 digital camera
1 Leica DM-2500 research trinocular petrographic microscope with UV and reflected light capability, Leica ____ digital camera
1 Nikon Labophot 12-pol binocular polarizing microscope
1 Leitz monocular petrographic microscope
1 Accu-scope inverted reflectance microscope
2 Leitz universal stages for petrographic microscopes
1 Fluid Inc. heating-freezing fluid inclusion stage, plus controller and two liquid nitrogen dewars
1 Linkham Fluid Inclusion stage and computer controller system with liquid nitrogen dewar
20 Bausch and Lomb binocular student stereo microscopes
12 Leica EZ4 binocular student microscopes
11 Unitron monocular petrographic student microscopes (Archived - replaced by Leica scopes above)
22 microscope illuminators (used for Unitron microscopes - Archived)
4 research-grade Bausch and Lomb and Leica binocular stereo microscopes
2 quartz wedges for petrographic analysis
Full set of index of refraction immersion oils
Assorted microscope objectives, including long-working distance and oil immersion
1.2 Water Testing and related equipment
USGS style AA and Mini current flow meters with Digimeter digital readout
2 Hach water quality testing kits capable for testing for nitrate, phosphate, chlorine, ammonia, dissolved oxygen, alkalinity
2 mini pH meters
1 Hach pH meter
1 Hach conductivity meter
1 Lamotte spectrophotometer
3 constant head permeameters for Hydrogeology Lab exercises
1 Secchi disk
1 SeaEagle 8 inflatable boat with seating for three and all accessories
1 Beta horizontal water sampler
1 sonar gun to determine water depth
2 Adult L/XL Personal Floatation Devices
1 Dissolved Oxygen/Conductivity meter with 50 foot cable (shared with Biology)
1.3 Miscellaneous equipment

1 Pomeroy diamond rock drill and core orienting device
1 Bison seismograph with analog recorder (currently not working)
1 Wards seismic station (currently unmounted)
7 Stereoviewers
Sensors and Software Ground Penetrating Radar unit with Smart Cart, 100Mhz and 250 Mhz antennas
1.4 Field Equipment
25 day-glow vests
18 hard hats
15 Brunton compasses
25 rock hammers and sledge hammers
assorted chisels
1 auger sediment sampler
2 alidades
2 tripods with plane tables
4 surveying rods
2 Jacob staffs
1 first aid kit
6 day-glow highway cones
2 100 m tapes
2 50 m tapes
6 hand levels
1 surveying chain
5 gold pans
6 Garmin GPS units
1 aneroid altimeter
1.5 Teaching Collections
>1000 sample systematic mineral collection
>700 sample rock petrology collection
> 1000 sample systematic fossil collection
set of available Connecticut geologic maps, including multiple copies of each
set of Connecticut topographic maps, including multiple copies of each
collection of state geological survey publications from PA, WV, VA, MA, VT, NH, CT, and other states
2 sets each of 100 thin sections of American rocks and 100 thin section of classic American rocks
multiple oriented mineral thin sections
hundreds of large teaching samples
micropaleontology collection
Set of 14 Bravais Lattice models
Set of 12 crystal lattice models
>100 field trip guidebooks from across the US

6 sets of 30 air photos for air photo interpretation
100s of topographic maps from around the US showing geologic features
1.6 Laboratory equipment and supplies
assorted thin section staining chemicals and staining unit
assorted laboratory glassware
assorted laboratory chemicals
1 Ohaus microgram electronic balance
8 lab scales
2 1600 gram Dialogram balances
ThermoFisher Sorvall ST16 centrifuge
1 six foot stream table
10 pair of waders, various sizes
Shimadzu high-pressure liquid chromatograph with ion chromatograph
ThermoScientiic Barnstead Smart2Pure 3 water purification system
3 Corning stirrers (1 large, 2 small)
Thermolyne 48000 furnace
2 Thermolyne 1400 furnaces
2 Soliist water level meters
1 Geotech Geopump
2 digital projectors
15 hand-held anemometers
1 Torvane soil shear device
5 electric hot plates
sandbox deformation unit for demonstrating compressional/extensional tectonics
Mettler PC4400 electronic balance
1 ceramic grinder
Rigaku bench-top X-Ray diffraction unit
1 iron mortar and pestle
multiple ceramic mortar and pestles
1.7 Rock Preparation Laboratory equipment and supplies
Buehler Thin sectioning system Buehler vacuum impregnator unit
Buehler Ecomet 3000 grinder polisher
Buehler grinder polisher
10" rock trim saw
24" rock saw
Naplo Model 420 Low temperature oven
2 sediment sieve shakers
1 Ro-tap sediment sieve shaker
25 Assorted sediment sieves
Hydraulic rock splitter
Tyler Sediment sample splitter

15 inch vibrating lap
24 inch vibrating lap
1 large Thermolyne muffle oven (not installed – needs a 220V line)
2 small Thermolyne muffle ovens
2. Equipment for the Meteorological Sciences
Fully equipped National Weather Service style weather station with WWW link
Various measurement equipment, including digital aerometers, barometers, thermometers, etc.
Tornado demonstration unit
3. Equipment for the Astronomical Sciences
10 inch Meade LX 200 GPS equipped Schmidt Cassegrain telescope with equatorial wedge and counter weight system for CCD photography. Mount is computerized with go-to capabilities.
13 inch Newtonian Reflector mounted on a Dobsonian alti-azimuth mount.
8 inch Newtonian Reflector mounted on a Dobsonian alti-azimuth mount.
5 inch Orion Refractor mounted on a German Equatorial mount.
Coronado 60mm PST solar telescope for daytime observations of the Sun.
6 inch Schmidt Cassegrain telescope on equatorial wedge mount with solar filter
binocular mount and three pairs of binoculars
Santa Barbara Instrument and Meade Instrument astronomical CCD digital imagers.
Group 128 16 inch Cassegrain telescope with an Equatorial mount and Drive system to track in right ascension.
Spitz 512 Planetarium instrument in a 35 foot in diameter dome to simulate the night sky for astronomy demonstrations.
video data projection system for planetarium presentations
separate, portable, video data projection system available for normal classroom and lecture use within the planetarium.

Appendix XV: Geological Sciences Computer Classroom Proposal with Software Requests (8 January 2015)

CCSU – CAPITAL PROJECTS AND SPACE PLANNING REQUEST FORM

project title: **Renovation of NC538 for use as a computer lab**

department: **Geological Sciences** fiscal year: **2014-2015**

Estimated amount requested: **To be Determined (see quotes for pat of cost)** funding source: **University**

department contact: **Mark Evans, Chair** phone **860-832-2936**

scope: new construction addition **renovation** equipment

space move: FROM:_____ TO:_____

site/location of project: **Copernicus Hall** dept. head/dean ranking:_____

brief explanation of project or space move request (attach any supporting documentation):

A full justification and proposal is attached.

is temporary (swing) space required during this project? **NO** if yes, identify the proposed location and anticipated move-in date.

vp or chief ranking: **capital projects priority level:**

approval: **date**: (vice president)

facilities dept. comments:

estimated amount requested: $

approval: **date:**
(assistant chief administrative officer for facilities or designee)

approval: **date**: (chief administrative officer)

ranking: _____

Geological Sciences Computer Classroom Proposal

Dr. Mark A. Evans, Professor and Chair
Geological Sciences Department

Introduction

In industry, government, and academia, knowledge of, and experience with, computer applications are vital to a successful career. For example, in environmental consulting, modeling of groundwater flow and groundwater chemistry is essential or predicting the fate and transport of subsurface contamination. In the oil and gas industry, the ability to model subsurface structures and stratigraphic layers aids in the exploration and development of these resources. Today, students coming into the workforce do not only need to be proficient in word processing and spreadsheet analysis, they are also expected to be able to use and understand geographic mapping programs (e.g., ArcMap) and occasionally image analysis software. Proficiency in computer use is essential for workforce development in the earth and space sciences.

In the Geological Sciences program at CCSU, we have been dedicated to incorporating computer applications into our classes by any means possible, but have been hampered by the **lack of facilities**. For example:

- We occasionally use the science computer lab on the second floor of Copernicus, but that is limited with only 10 PCs and 10 Macs. Some of the available software (e.g., ArcMap) however, is only on a PC platform, so that leaves 10 PCs for up to 15 to 20 students. There is no teaching station or computer projector for demonstrations, and these computers do not have the specialized software that we need to train our students.
- We have also occasionally tried to use the computer classrooms on the outer ring of Copernicus, but these rooms are not always available when we need them, nor do they have necessary specialized software that we need to train our students.
- Finally we have used the computers in 538 NC. However, there are only 8 computers in this classroom and they are not networked. There is no teaching station or computer projector for demonstrations, and these computers do not have the specialized software that we need to train our students.
- As a last resort, we ask our students to download freeware to use on their personal computers, but because of the mix of platforms (PC vs Mac) this is not a tenable alternative.

Because of the limitations of resources and difficulties of accessing computers, we have not included computer-based exercises in most classes. Our students, therefore, are not receiving all of the necessary skills they need to secure a good job and be successful in the workplace.

Current Facilities

Room 538NC has historically been the 'Meteorology Lab.' It was where our former meteorologist Dr. Steve Newman (emeritus) held his introductory and advanced meteorology classes. He was instrumental in acquiring the 8 PCs that are in the room now and the weather station computer also located in the room. After Dr. Newman's retirement

in 2012, the room has been used for ESCI 129 Introductory Meteorology labs, ESCI 290 Field Methods class, and ESCI 208 Planetary Astronomy class.

Room 538NC currently has six tables sandwiched between six counters housing sinks and gas outlets. The tables are closely spaced together and the computers take up a significant tabletop footprint. Seating in the room is for 24 students. Several large cabinets have been removed from the room by facilities in order to open up the space and provide more access. However, the room is not ADA compliant, a necessity for one earth science faculty member and the occasional student. Maneuverability of a wheelchair between the student seats for faculty-student assistance is impossible.

The Earth Science program also has two computers located in 23103NC. This room has been used exclusively by Dr. Piatek to teach her upper level ESCI 478 Planetary Image analysis class. Access to this room is only through a lecture hall (231NC), through a locked door at the end of a hallway, or through the back door of the science computer lab. The room is small, only about 10 x 10 feet. It is impossible for students to use the computers in this room unless Dr. Piatek lets them in.

Proposed Computer Classroom

In order to provide our students with the greatest possible opportunities to gain computer experiences that can be directly transferred to the job market, we propose the development of a full computer classroom in the space of room 538NC. Since most of our lab classes have between 15 to 24 students, we feel that a **24 workstation** computer lab would be adequate. In addition, there would be a **teaching station with a computer projector** that was also networked.

Courses to Benefit

The following courses could integrate computer applications **if the facilities are made available**. Please note that currently, most of these classes have little if any computer-based exercises.

- **ESCI 125 Dynamic Earth Lab (35-40 students per semester):** Incorporate exercises using GoogleEarth and GigaPans. Use Excel for lab calculations and plotting.
- **ESCI 135 Environmental Geoscience Lab (35-40 students per semester):** Incorporate exercises using Google Earth and GigaPans. Use Excel for lab calculations and plotting.
- **ESCI 129 Meteorology Lab (36-40 students per semester):** Access current meteorological information and forecasts, and ability to process lab data in Excel.
- **ESCI 290 Field Methods (10-15 students each Fall):** We currently do an ArcGIS-based project in the Science computer lab. Expand on this and add additional mapping applications. Process Ground Penetrating Radar data.
- **ESCI 208 Planetary Astronomy (36 students each Fall):** Incorporate exercises using GoogleEarth, GoogleMars and planetary images from NASA and other sources. Plot experimental data.
- **ESCI 209 Stellar and Galactic Astronomy (36 students each Spring):** Access large data sets, plot experimental data.

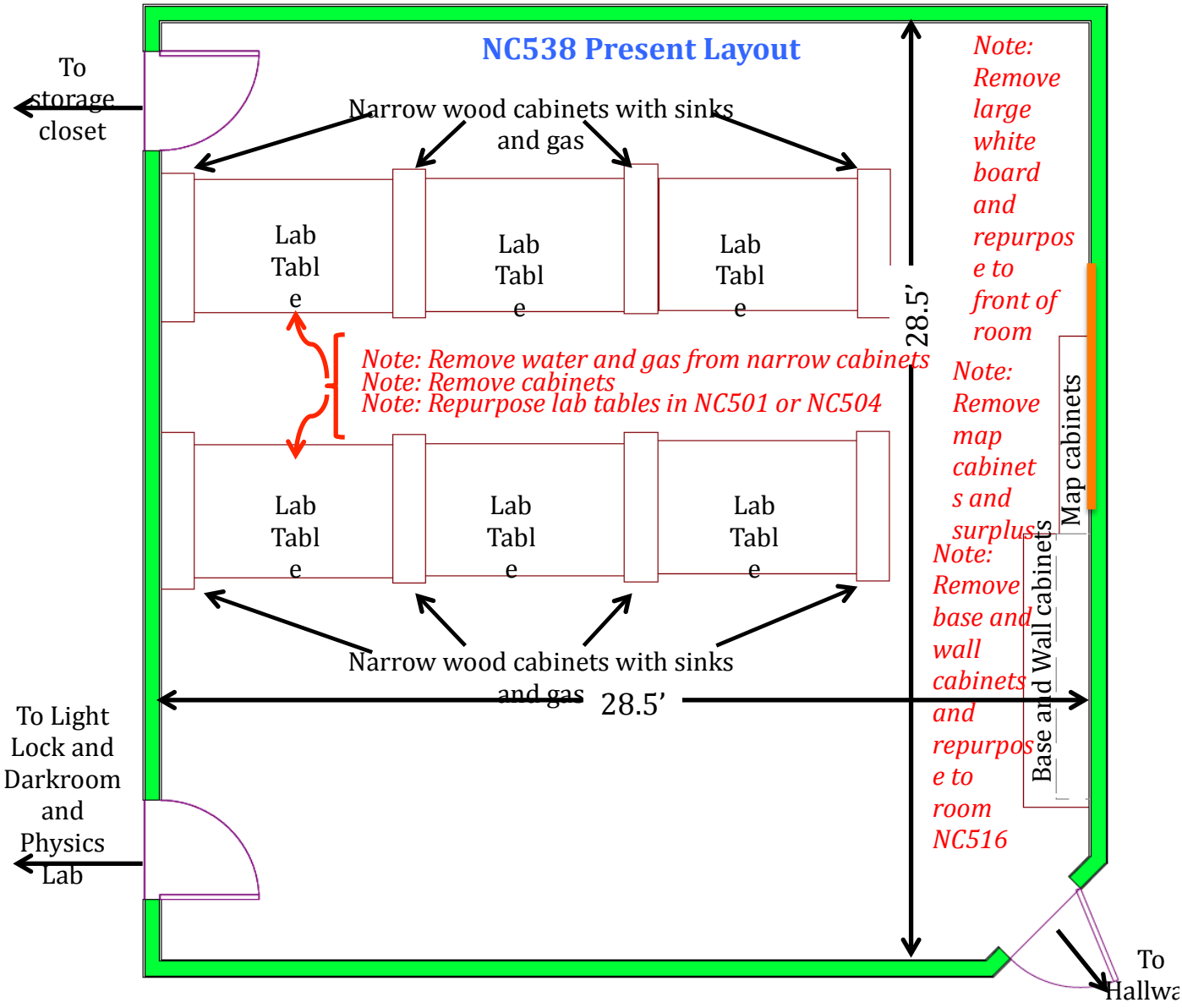
- **ESCI 221 Mineralogy (10-15 students each Fall):** Do spreadsheet analysis of mineral formulae, plot mineral data.
- **ESCI 223 Stratigraphy and Sedimentology (10-15 students each Spring):** Use geological software to plot data, make maps, and create stratigraphic sections. Do spreadsheet analysis of experimental data.
- **ESCI 321 Structural Geology (10-15 students each Fall):** Use geological software to plot data, and analyze data. Use GoogleEarth to examine structures around the world.
- **ESCI 322 Petrology (10-15 students ever other Spring):** Use spreadsheet analysis to analyze rock composition data, Examine large igneous structures using GoogleEarth. Plot rock composition data using geological software.
- **ESCI 360 Research Methods (10-15 students Each Spring):** Access electronic research databases like GeoRef and GeoScienceWorld.
- **ESCI 378 Comparative Planetology (10-15 students ever other Spring):** Use ArcGIS to examining images of planets and moons, along with the Earth.
- **ESCI 424 Geomorphology (10-15 students each Spring):** Incorporate exercises using GoogleEarth and ArcGIS.
- **ESCI 425 Glacial and Quaternary Geology (10-15 students each Fall):** Incorporate exercises using GoogleEarth and ArcIS.
- **ESCI 431 Hydrogeology (10-15 students every other Spring):** Use modeling software with experimental data to determine aquifer properties. Use geological software to model groundwater chemistry and groundwater flow.
- **ESCI 460 Senior Project (5-10 students each semester):** students doing their research projects.
- **ESCI 478 Planetary Image analysis (10 students every other Spring):** Process planetary images using ENVI and ArcGIS. Students would utilize this software for hands-on satellite image processing exercises (including spectral, radar, and LiDAR datasets), as well as integrating results into GIS databases via ArcGIS.
- **ESCI 4XX Geological Applications of GIS (proposed course) (10-15 students each Fall):** Use ArcGIS to approach a variety of earth science problems.
- **ESCI 4XX Environmental Geochemistry (proposed course) (10-15 students every other Spring):** Use geological software to plot data and to model chemistry.

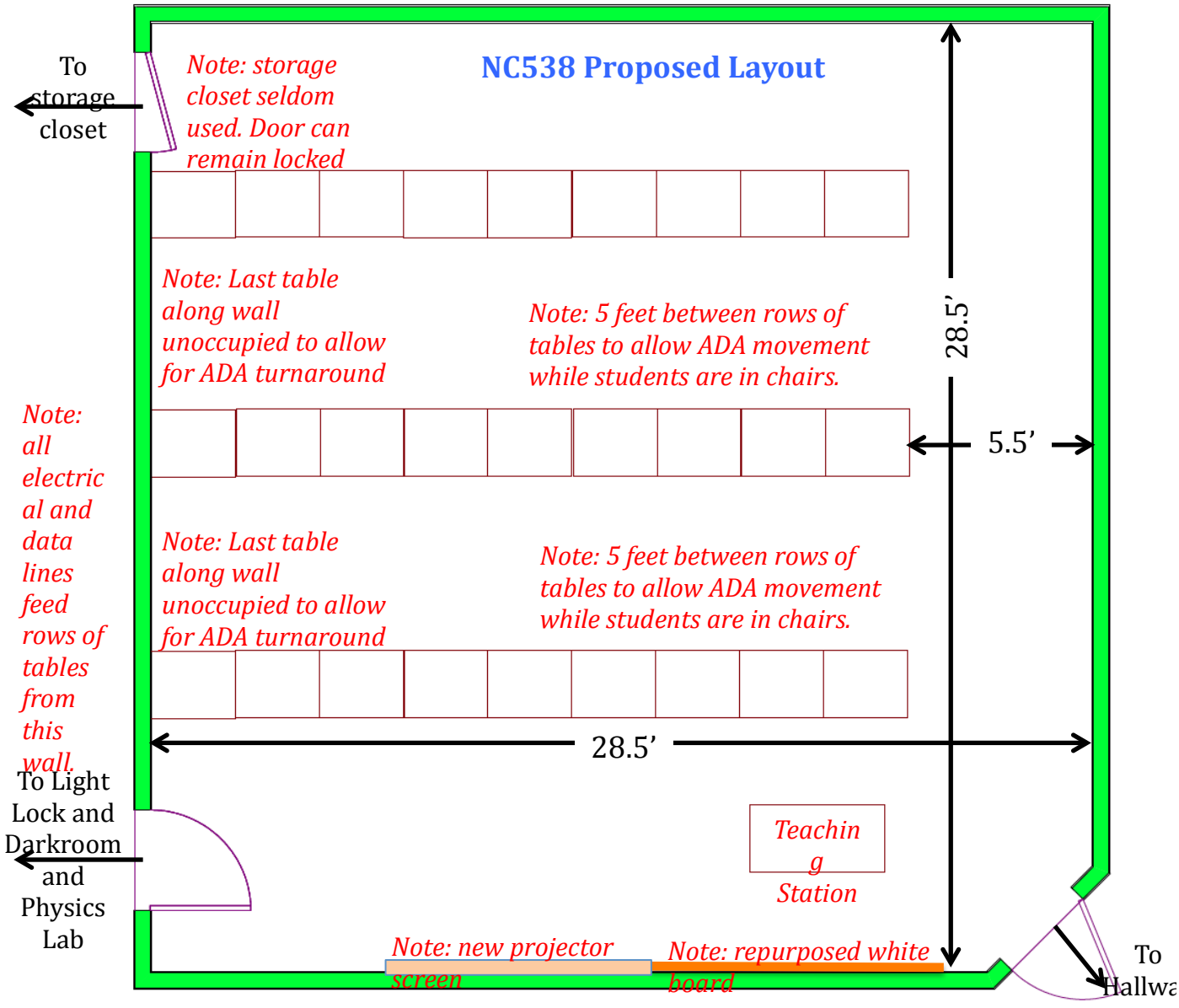
Room Renovations Needed

In order to make NC538 a viable teaching computer classroom, the following needs to be done:

- Remove current tables and repurpose (in either NC501 or NC504).
- Remove floor and wall cabinets and repurpose to NC516.
- Remove map cabinets along wall and surplus.
- Remove and remount white board currently in NC538.
- Remove eight mini-sinks and gas outlets in the middle of the room. Cost TBD.
- Add 15 additional data ports (12 for students PCs, one for instructor, and two for printers) to supplement 12 existing and wire room for table layout (See attached Figure).
- Rewire electrical for table layout (See attached Figure). Cost TBD.
- Paint room. Cost TBD.
- Add projector Screen. Cost TBD.
- Remove existing floor tile and add carpet (see attached quote from BCI).

- Twenty-seven (27) KI WorkZone Basic Work Tables (24”D x 30”W x 29”H) as per plan (See attached Figure) (see attached quote from BCI). Three additional tables are requested to allow for ADA turnaround at end of row.
- Twenty-four (24) KI Kismet Mid-Back Task Chairs (see attached quote from BCI).
- One Enlite Rectangle Fixed Leg ADA Table (24”D x 48”W x 32”H) for instructor (See attached Figure) (see attached quote from BCI).
- Twenty-five (25) RightAngle Under Surface CPU Holders (See attached quote form BCI).




NC538 Proposed Layout
To storage closet
Note: storage closet seldom used. Door can remain locked
Note: Last table along wall unoccupied to allow for ADA turnaround
Note: 5 feet between rows of tables to allow ADA movement while students are in chairs.
Note: Last table along wall unoccupied to allow for ADA turnaround
Note: 5 feet between rows of tables to allow ADA movement while students are in chairs.
Note: all electrical and data lines feed rows of tables from this wall.
28.5'
5.5'
28.5'
To Light Lock and Darkroom and Physics Lab
Teaching Station
Note: new projector screen
Note: repurposed white board
To Hallway

Please describe the purpose of this software	Number of licenses requested? Please note if you need a site license.	What operating system is this software used on?	Please provide the URL of the software website.	What type of request is this?	What is the approximate cost of this software? What is the estimated cost based on?	Will there be future yearly costs associated with this request? No; Yes, What is the estimated yearly cost?	Please select the anticipated source of funding. Univeristy, School, Departmen t, No Cost	Please list the course(s) that will be using this software and the approximate enrollment per course per semester.	Where will this software need to be installed? This can be a physical location i.e. NC22414 or a virtual location i.e. server in IT. Is this location a classroom or lab?	Briefly explain the importance of your request. What is the role of this software in your curriculum?	Please add any additional comments.
This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 25 when new lab installed	Windows 7	http://www.frederickvollmer.com/ellipsefit/	New Software	No Cost	No Cost	No Cost	ESCI 321 Structural geology (10-20 students every year) ESCI 460 Senior Project (5-10 students per year)	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	This software does rock strain analysis. It is required for lab exercises and for student senior project research. Used extensively in the private sector. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty are planning to improve the technology content in the curriculum. Obtaining this software would allow this proposed improvement to bring the curriculum up to date.	Free for academic use
This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 25 when new lab installed	Windows 7	http://www.geo.cornell.edu/geology/faculty/RWA/programs/	New Software	No Cost	No Cost	No Cost	ESCI 321 Structural geology (10-20 students every year) ESCI 460 Senior Project (5-10 students per year) ESCI 450 Environmental & Engineering Geology (15-20 students every other year)	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	This software plots rock structural data. It is required for lab exercises and for student senior project research. Used extensively in the private sector. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty are planning to improve the technology content in the curriculum. Obtaining this software would allow this proposed improvement to bring the curriculum up to date.	Free for academic use
This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 25 when new lab installed	Windows 7	http://www.holcombe.net.au/software/rodh_software_geocalc.htm	New Software	No Cost	No Cost	No Cost	ESCI 321 Structural geology (10-20 students every year) ESCI 460 Senior Project (5-10 students per year) ESCI 450 Environmental & Engineering Geology (15-20 students every other year)	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	This software calculates rock structure angles and other relationships. This software is required for lab exercises and for student senior project research. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty are planning to improve the technology content in the curriculum. Obtaining this software would allow this proposed improvement to bring the curriculum up to date.	Free for academic use
This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 25 when new lab installed	Windows 7	http://www.holcombe.net.au/software/rodh_software_georient.htm	New Software	No Cost	No Cost	No Cost	ESCI 321 Structural geology (10-20 students every year) ESCI 460 Senior Project (5-10 students per year) ESCI 450 Environmental & Engineering Geology (15-20 students every other year)	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	This software plots rock structural data. It is required for lab exercises and for student senior project research. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty are planning to improve the technology content in the curriculum. Obtaining this software would allow this proposed improvement to bring the curriculum up to date.	Free for academic use

Name of software requested:	Please describe the purpose of this software	Number of licenses requested? Please note if you need a site license.	What operating system is this software used on?	Please provide the URL of the software website.	What type of request is this?	What is the approximate cost of this software? What is the estimated cost based on?	Will there be future yearly costs associated with this request? No; Yes, What is the estimated yearly cost?	Please select the anticipated source of funding. Univeristy, School, Department, No Cost	Please list the course(s) that will be using this software and the approximate enrollment per course per semester.	Where will this software need to be installed? This can be a physical location i.e. NC22414 or a virtual location i.e. server in IT. Is this location a classroom or lab?	Briefly explain the importance of your request. What is the role of this software in your curriculum?	Please add any additional comments.
3D Move 2015	This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 25 when new lab installed	Windows 7	http://www.mve.com/software/move	New Software	No Cost	No Cost	No Cost	ESCI 321 Structural geology (10-20 students every year) ESCI 460 Senior Project (5-10 students per year)	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	This software creates and retrodeforms geologic cross sections. It also models burial and fracture formation in fold belts. It is required for lab exercises and for student senior project research. This software is the default structural modeling software in the Oil and Gas Industry. It will contribute significantly to our student's workforce readiness. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty are planning to improve the technology content in the curriculum. Obtaining this software would allow this proposed improvement to bring the curriculum up to date.	Free to academic institutions. Dr. Mark Evans, Geological Sciences, is a current member. See http://www.mve.com/academic/academic-software-initiative. This software requires enhanced computer RAM and graphics card. See specifications at: http://www
Topodrive and Particle Flow	This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 25 when new lab installed	Windows 7	http://water.usgs.gov/nrp/gwsoftware/tdpf/tdpf.html	New Software	No Cost	No Cost	No Cost	ESCI 431 Hydrogeology (15-20 students every other year) ESCI 460 Senior Project (5-10 students per year) ESCI 490 Environmental Geochemistry (10-20 students every other year). Future courses in anticipated Environmental Engineering and Geological Engineering MS programs	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	This software comprises two Computer Models for Simulation and Visualization of Groundwater Flow and Transport of Fluid Particles in Two Dimensions. It is required for lab exercises and for student senior project research. This software is commonly used in the environmental consulting Industry. It will contribute significantly to our student's workforce readiness. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty are planning to improve the technology content in the curriculum. Obtaining this software would allow this proposed improvement to bring the curriculum up to date.	Free for academic use

Name of software requested:	Please describe the purpose of this software	Number of licenses requested? Please note if you need a site license.	What operating system is this software used on?	Please provide the URL of the software website.	What type of request is this?	What is the approximate cost of this software? What is the estimated cost based on?	Will there be future yearly costs associated with this request? No; Yes, What is the estimated yearly cost?	Please select the anticipated source of funding. Univeristy, School, Departmen t, No Cost	Please list the course(s) that will be using this software and the approximate enrollment per course per semester.	Where will this software need to be installed? This can be a physical location i.e. NC22414 or a virtual location i.e. server in IT. Is this location a classroom or lab?	Briefly explain the importance of your request. What is the role of this software in your curriculum?	Please add any additional comments.
Aqtesolv Pro	This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 25 when new lab installed	Windows 7	http://www.aqtesolv.com/versions.htm	New Software	$750 for academic site lic.	No Cost	University	ESCI 431 Hydrogeology (15-20 students every other year) ESCI 460 Senior Project (5-10 students per year) ESCI 490 Environmental Geochemistry (10-20 students every other year). Future courses in anticipated Environmental Engineering and Geological Engineering MS programs	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	This software does Aquifer test analysis to determine aquifer properties. It is required for lab exercises and for student senior project research. This software is the industry standard for the environmental consulting Industry. It will contribute significantly to our student's workforce readiness. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty are planning to improve the technology content in the curriculum. Obtaining this software would allow this proposed improvement to bring the curriculum up to date.	
Rockworks 16	This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 25 when new lab installed	Windows 7	https://www.rockware.com/product/featureCategories.php?id=165	New Software	$1000, RockWorks16 (Level 4): Academic Classroom Lic (1 single lic + 10 NW seats). After room NC538 is renovated, (1 single lic + 25 NW seats, $1200)	No Cost	University	ESCI 290 Geological Field Methods (10-15 students every Fall) ESCI 223 Sedimentology & Stratigraphy (10-20 students every year) ESCI 221 Mineralogy (10-20 students every year) ESCI 321 Structural geology (10-20 students every year) ESCI 322 Petrology (10-20 students every other year) ESCI 424 Geomorphology (10-20 students every year) ESCI 431 Hydrogeology (15-20 students every other year) ESCI 450 Environmental & Engineering Geology (15-20 students every other year) ESCI 460 Senior Project (5-10 students per year) ESCI 490 Environmental Geochemistry (10-20 students every other year). Future courses in anticipated Environmental Engineering and Geological Engineering MS programs	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	This software is a full analytical and data visualization package for all types of geologic data. It is required for lab exercises and for student senior project research. It will contribute significantly to our student's workforce readiness. It is critical that CCSU Geological Sciences majors receive training in computer technology in order to compete for job opportunities (including graduate school). Rockworks has long been the standard in the petroleum, environmental, geotechnical and mining industries for subsurface data visualization. It is the ideal software program for numerous course-related applications in our curriculum and will be integrated in nearly every upper-level geoscience class in both laboratory exercises and classroom assignments. In addition, it will be heavily utilized by students involved in independent research (ESCI 460 -a required class) in order to facilitate their work and to provide professional data visualizations for their presentations. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty	Rockworks 16 is a suite of software programs that allow geoscientists and engineers the ability to visualize surface and subsurface geological datasets. It is a powerful tool for creating maps, well logs, cross sections, fence diagrams, solid models and volumetrics. In
MODFLOW-2005 v.1.11.00	This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 25 when new lab installed	Windows 7	http://water.usgs.gov/ogw/modflow/	New Software	No Cost	No Cost	No Cost	ESCI 431 Hydrogeology (15-20 students every other year) ESCI 460 Senior Project (5-10 students per year) ESCI 490 Environmental Geochemistry (10-20 students every other year). Future courses in anticipated Environmental Engineering and Geological Engineering MS programs	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	This software models groundwater flow. It is required for lab exercises and for student senior project research. This software is an industry standard in the environmental consulting Industry and in the federal and most state governments. It will contribute significantly to our student's workforce readiness. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty are planning to improve the technology content in the curriculum. Obtaining this software would allow this proposed improvement to bring the curriculum up to date.	MODFLOW relies on a graphical user interface (GUI) to prepare the input files and post-process the output files. This is ModelMuse (a separate software package)

Name of software requested:	Please describe the purpose of this software	Number of licenses requested? Please note if you need a site license.	What operating system is this software used on?	Please provide the URL of the software website.	What type of request is this?	What is the approximate cost of this software? What is the estimated cost based on?	Will there be future yearly costs associated with this request? No; Yes, What is the estimated yearly cost?	Please select the anticipated source of funding. Univeristy, School, Department, No Cost	Please list the course(s) that will be using this software and the approximate enrollment per course per semester.	Where will this software need to be installed? This can be a physical location i.e. NC22414 or a virtual location i.e. server in IT. Is this location a classroom or lab?	Briefly explain the importance of your request. What is the role of this software in your curriculum?	Please add any additional comments.
ModelMuse Version 3.3	This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 25 when new lab installed	Windows 7	http://water.usgs.gov/nrp/gwsoftware/ModelMuse/ModelMuse.html	New Software	No Cost	No Cost	No Cost	ESCI 431 Hydrogeology (15-20 students every other year) ESCI 460 Senior Project (5-10 students per year) ESCI 490 Environmental Geochemistry (10-20 students every other year). Future courses in anticipated Environmental Engineering and Geological Engineering MS programs	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	This software is a Graphical user interface and Pre-, Post processor for Modflow. It is required for lab exercises and for student senior project research. This software is an industry standard in the environmental consulting Industry and in the federal and most state governments. It will contribute significantly to our student's workforce readiness. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty are planning to improve the technology content in the curriculum. Obtaining this software would allow this proposed improvement to bring the curriculum up to date.	Required to run Modflow
OriginPro 2015	This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 21 when new lab installed	Windows 7	http://www.originlab.com/index.aspx?go=PRODUCTS/OriginPro	New Software	10 seat annual license, $690. After NC538 renovation, 20 seat annual license, $1040 renewable, faculty member gets own permanent copy	$690 ($1040)	University	ESCI 223 Sedimentology & Stratigraphy (10-20 students every year) ESCI 322 Petrology (10-20 students every other year) ESCI 431 Hydrogeology (15-20 students every other year) ESCI 450 Environmental & Engineering Geology (15-20 students every other year) ESCI 460 Senior Project (5-10 students per year) ESCI 490 Environmental Geochemistry (10-20 students every other year). Future courses in anticipated Environmental Engineering and Geological Engineering MS programs	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	This software is a scientific statistical analysis and visualization package. It is significantly different from SPSS (the Social Sciences stgatistical package) in that it can plot data specific to the geological sciences such as ternay plots, wind roses, and polar plots. It is required for lab exercises and for student senior project research. This software is commony used in the environmental consulting Industry and in federal state governments. It will contribute significantly to our student's workforce readiness. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty are planning to improve the technology content in the curriculum. Obtaining this software would allow this proposed improvement to bring the curriculum up to date.	
GW_Chart (Version 1.27.0.0)	This software supports classroom educational activities. See justification for more details.	8 (total number of computers in NC538) Ultimately 25 when new lab installed	Windows 7	http://water.usgs.gov/nrp/gwsoftware/GW_Chart/GW_Chart.html	New Software	No Cost	No Cost	No Cost	ESCI 431 Hydrogeology (15-20 students every other year) ESCI 460 Senior Project (5-10 students per year) ESCI 490 Environmental Geochemistry (10-20 students every other year). Future courses in anticipated Environmental Engineering and Geological Engineering MS programs	NC538 Geological Sciences Lab. This room currently had 8 PCs in it. We have submitted a hardware proposal to remodel this room for use by introductory and upper-level Geological Sciences classes that require computer facilities.	GW_Chart is a program for creating specialized graphs used in groundwater studies. It creates graphs and plots not found in OriginPro or SPSS. This software is an industry standard in the environmental consulting Industry and in the federal and most state governments. It will contribute significantly to our student's workforce readiness. Geological Sciences currently has no ability to incorporate technology into the curriculum. With the addition of this software and the expansion of the computer lab in NC538, the Geological Sciences faculty are planning to improve the technology content in the curriculum. Obtaining this software would allow this proposed improvement to bring the curriculum up to date.	Free for academic use

Appendix XVI: Internal and External Funding History for 2009-2015

Year	Amount	Recipients and Title
2009-2010	$106,030.00	**Thomas, J. & Bednarski, M.** (2009). Interdisciplinary Science, Inquiry and Literacy Institute. Teacher Quality Partnership Grant. Connecticut State Department of Higher Education.
	$103,798.00	**Bednarski, M.** & Drew, S. (2008-10). Science Inquiry Learning Communities (SILC). CT State Dept. Of Education MSP grant program.
	$5,000.00	**Evans.** Penn State's Appalachian Basin Black Shales Group (ABBSG) grant to investigate fluid inclusions in four Marcellus shale cores.
	$2,295.00	**Evans.** "Bedrock Mapping and Analyses of the Eastern Half of the Luray 7.5' Quadrangle, Virginia" January 2010, USGS-EDMAP Proposal Awarded to Dr. Steven Whitmeyer, James Madison University. Mark A. Evans Co-PI. ($2295 is CCSU part)
	$3,650.00	**Evans, Piatek, Wizevich.** "Collection of rock sample suites for use in Earth Science courses" 2010 CCSU/AAUP Curriculum Development Grant: Mark A. Evans, Jennifer Piatek and Michael Wizevich, Co-PIs.
	$2,950.00	**Evans.** "Development of a course, Science and Sustainability, a part of the core curriculum for two Global Sustainability Master's Programs" 2010 CCSU/AAUP Curriculum Development Grant: Mark A. Evans and Clayton Penniman, Co-PIs.
	$1,454.00	**Evans.** "Geology field study in the Great Valley of Virginia" 2009 CCSU A & S Dean's Research Initiative Grant
	$1,000.00	**Larsen.** "Science and Society: Assessing Student Learning in an Interdisciplinary Honors Science Course." 2009 CSUS Assessment Grant.
	$3,500.00	**Larsen**. "Restoring Science to its "Rightful' Place: Science Students as Citizens." 2009 CCSU Community Engagement Grant.
	$600.00	**Larsen.** "Seeing the 20th Century through Undead Eyes: Development of an Honors Course on Science, Popular Culture, and the Zombie." 2010 CCSU Summer Curriculum Development Grant. With Ron Todd (Art Department).
	$1,850.00	**Larsen.** "Sisters in Science: Archival Research on the Lives and Careers of Astronomer Antonia Maury and Geologist Carlotta Maury." 2010 CSUS University Research Grant.
	$3,948.00	**Thomas, J.** (2010). Secondary Teachers' Beliefs and Practice of State-Initiated Inquiry-Oriented Instruction. CSU University Research Grant.
	$2,400.00	**Thomas, J.** (2010). Research Dissemination of CT Science Education Reform at the 2010 National Science Teachers Association and the 2010 National Association of Research in Science Teaching Conferences in Philadelphia, Pennsylvania. CCSU Faculty Development Grant.
	$3,948.00	**Thomas, J.** (2009). Elementary and Middle School Teacher Attitudes and Practice toward State Policy Changes to Improve Student Achievement in Science. CSU University Research Grant.
	$2,813.00	**Thomas, J. & Bednarski, B.** (2009). Workshop on Laboratory Science Safety for Elementary and Secondary School as it Relates to the National Council of Accreditation of Teacher Education (NCATE) Science Safety Standards. CCSU Faculty Development Grant.
	$1,200.00	**Wizevich.** Faculty Development Grant proposal. Attendance at the Northeastern/Southeastern Joint Section Meeting of the Geological Society of

		America, Baltimore, Maryland.
	$606.00	**Wizevich,** Faculty-student research grant to investigate trace fossils in Utah with Keenan Golder
	$5,000.00	**Wizevich.** CSU University Research Grant for continuation of research in Utah. Geologic Study of the Brian Head Formation, Casto Canyon Area, Southwestern Utah.
Total	**$252,042.00**	
2010-2011	$3,500.00	**Bednarski, M., Thomas, J.,** DeLaura, J., Foster, P., Sianez, D. (2011) "Science, Technology, Engineering, Math (STEM) in Higher Education." AAUP Curriculum Development Grant.
	$2,000.00	**Bednarski, M., Thomas, J.** (2010-11)"Enhancing Elementary Pre-Service Teacher's Science Content Knowledge," CCSU Assessment Grant.
	$3,200.00	**Evans,** "Presentation of Research at the European Geosciences Union General Assembly, Vienna, Austria." 2011 CCSU/AAUP Faculty Development Grant: Mark A. Evans PI.
	$4,991.00	**Evans.** "Fluid evolution and changes in deformation conditions during the formation of the central Appalachian fold-and-thrust belt of Pennsylvania" 2011 CCSU/AAUP faculty research Grant: Mark A. Evans PI.
	$1,243.00	**Evans,** "Sample Collection for a Structural and Fluid History of the Marcellus Shale: Appalachian Valley and Ridge, Central Pennsylvania" 2010 CCSU A & S Dean's Research Initiative Grant
	$4,660.00	**Piatek, Evans, Wizevich.** "Redesign of Introductory Historical Geology Laboratory Curriculum: From Passive to Active Learning Styles" 2011 CSU/AAUP Curriculum development grant: Michael Wizevich, Mark Evans, Jennifer Piatek CO-PIs.
	$2,000.00	**Larsen.** "Creating Learning Outcomes for an Interdisciplinary Honors Program." 2010 CSUS Assessment Grant. With Paul Petterson.
	$1,900.00	**Thomas, J.** (2011). Presentation of Inquiry Teaching Strategies at the 2011 National Science Teachers Association. CCSU Faculty Development Grant.
	$4,750.00	**Wizevich.** "Geologic Study of the Brian Head Formation, Southwestern Utah." 2011-12 AAUP University Research Grant.
	$575.00	**Wizevich,** Geochemical Analyses of Late Cretaceous (70 million year old) Soils for Paleoclimatic Reconstructions."
Total	**$28,819.00**	
2011-2012	$700.00	**Evans.** CCSU Faculty Student Research Grant: titled "Testing the Extent of Fluid Migration in the Marcellus shale, Central Pennsylvania" with Jeremy Leo.
	$3,200.00	**Evans.** CCSU/AAUP Faculty Development Grant. "Presentation of Research at the Geofluids VII 2012 International Conference, Institut Français du Pétrole, IFP (French Petroleum Institute), Rueil-Malmaison, France"
	$7,400.00	**Bednarski, M.** (author), Thomas, J. DeLaura, J, Foster, P, Robin Kalder, G. Cueto (2012, April). STEM Undergraduate Elementary Certification and Graduate Degree Programs. CCSU Curriculum Development Grant.
	$5,663.00	**Bednarski, M.** (author), Thomas, J. DeLaura, J, Foster, P, Sianez, D (2011, April). Developing a STEM Masters Program. CCSU Summer Curriculum Development Grant.

	$6,480.00	**Thomas, J.** & Drew, S. (2012, May). Assessing Science Teachers Beliefs: A Mixed Method Study of a Mentoring Program. CSU University Research Grant.
	$1,946.00	**Thomas, J.** (2011, November). Presentation of Research Project for the International Association for Technology, Education and Development. CCSU Faculty Development Grant.
	$2,000.00	**Wizevich.** May 2012 CCSU/AAUP Faculty Development Grant. "Attendance at the 29th International Association of Sedimentologists Meeting in Schladming, Austria."
	$3,387.00	**Wizevich.** April 2012 CCSU Curriculum Development Grant with Dr. Jennifer Piatek "Learning on Ice: Development of Online Learning Resources for Glacial Geology and the Development of Hybrid Courses using GigaPan Technology"
	$5,000.00	**Wizevich.** April 2012 CSU/AAUP Research Grant Investigation of the Triassic Reptile Trackways Localities of Vieux Emosson, Switzerland: Insights into the Origin of Dinosaurs"
	$500.00	**Wizevich.** November 2011 CCSU Faculty Student Research Grant: titled "Towards the characterization of three volcanic sedimentary rock units in southwestern Utah: Geochemical analyses of samples collected from Hatch Mountain, Garfield County, Utah." with Scott Braddock
	$510.00	**Wizevich.** November 2011 CCSU Faculty Student Research Grant: titled "Interpreting fluid-flow pathways and mineralization conditions of barite concretions through the use of stable-isotope mass spectrometry." with Alex Steullet
Total	**$36,786.00**	

2012-2013	$142,935.00	**Bednarski.** TEACHER QUALITY PARTNERSHIP GRANT, C0-Principal Investigator. Mitigating Impacts of Climate Change: Interdisciplinary STEM and CCSS Pathways. No Child Left Behind Act of 2001, Title II, Part A Subpart 3, Improving Teacher Quality State Grand Funds, CFDA #84.367B, Department of Higher Education. March 2013 to June 2014.
	$15,000.00	**Thomas J.** (2012-2014). Curriclum Writer and Researcher. InTeGrate: Interdisciplinary Teaching about Earth for a Sustainable Future. National Science Foundation, NSF Grant# 1125331. Award: $10,000,000 (2012 to 2016 five-year project). My Award: $15,000
	$6,200.00	**Bednarski.** Summer Curiculum Developmetn Gant. Principal Investigator STEM Undergraduate Elementary Certification and Graduate Degree Programs
	$1,700.00	**Bednarski.** Faculty Development Grant (2013) National Conference on Science Education: Next Generation Science: Learning, Literacy, and Living
	$6,480.00	**Thomas.** Assessing Science Teachers Beliefs: A Mixed Method Study of a Mentoring Program. CSU University Research Grant. May 2012 to September 2013 (delayed one year).
	$5,000.00	**Wizevich.** 2013 AAUP-University Research grant, Investigation of the Triassic Reptile Trackways Localities of the Emosson area, Switzerland: Insights into the Origin of Dinosaurs
	$65,000.00	**Evans.** ACS/PRF Grant: Fluid evolution and changes in deformation conditions during the formation of the central Appalachian fold-and-thrust belt of Pennsylvania.
	$15,000.00	**Evans.** Grant from Southwest Research Institute, San Antonio, TX to study of veins in the Eagle Ford Formation southwest Texas.

total	**$257,315.00**	
2013-2014	$40,085.00	Professional Development Provider. Lehman, L., **Thomas, J.**, Drew, S., **Bednarski, M.** (October, 2013). Using Problem-based Learning to Build Scientific Literacy Communities. Education Reform District: K-8 Science Improvement Grant. PA 13-184: An Act Concerning Expenditures and Revenue. Connecticut Department of Education. November 2013 to September 2014. Award: $40,085 – Meriden CT School District
	$130,000.00	Researcher and Professional Development Provider. **Thomas, J., Bednarski, M.,** Drew, S. Maur, B (PI). (2014). The New Terrain Next Generation Science Teaching Project. Mathematics and Science Partnership (MSP) through the Connecticut Department of Education. February 2014 to July 2015. Award: $130,000 – Fairfield University
	$134,000.00	Professional Development Provider & Budget Manager. **Bednarski, M, Thomas, J., Larsen, K.,** (ESCI faculty) Settlage, J., Pedro, J. Balisciano, N (PI). (2014). Next-Gen Science CT. Mathematics and Science Partnership (MSP) through the Connecticut Department of Education. February 2014 to July 2015. Award: $134,000 – Connecticut Center for Advanced Technology (CCAT)
	$166,922.00	Professional Development Provider for Next Generation Science Standards (NGSS) and The Framework for K-12 Science Education. **Bednarski, M.** Green LEAF Professional Learning Communities Grant. Funded by the CT Office of Higher Education (Teacher Quality Partnership—TQP---funds). April 2014-August 2015. $166,922- ECSU
	$1,100.00	**Bednarski.** Faculty Development Grant (2014) $1100. 2014 STEM Forum and Expo, National Science Teachers Association, New Orleans, LA. Presenter and participant.
	$4,991.00	**Evans.** CSU/AAUP Research Grant to Evans. "Fluid evolution and changes in deformation conditions during the formation of the central Appalachian fold-and-thrust belt of Pennsylvania"
	$1,547.00	**Evans.** CCSU Summer Faculty – Student Research Grant to Nathan Pirovane (student) and Evans. "Examination of lead deposits in Central Connecticut."
	$2,000.00	**Oyewumi.** Summer-Faculty Student Research Grant," Evaluating mobility and transport of trace elements within Coginchaug River estuary systems, Durham, with Amanda Cross
	$4,000.00	**Oyewumi.** AAUP Faculty Research Grant, Evaluating release of trace elements within an agricultural catchment of the Ten-mile estuary system, Lebanon, CT"
	$4,000.00	**Oyewumi, Wizevich.** Curriculum Development Grant (Michael Wizevich, Co-PI), "Redesign of Geological Field Methods Course Curriculum: Integrating Technology OUT of the Classroom."
	$35,000.00	**Piatek.** "Senior Personnel" on a proposal titled "Collaborative Research: Google Earth for Onsite and Distance Education (GEODE)" that was awarded funding from the NSF Transforming Undergraduate Education in STEM (TUES) program in September, 2013. Anticipated funding: $35K over 4 years to CCSU, including F&A costs
	$2,200.00	**Bednarski, Thomas.** CCSU Faculty Development Grant: Co-principal Investigator. Bednarski, M., Thomas, J. (2014). 2014 STEM Forum and Expo: Integration for Innovation. CCSU Faculty Development Grant, 2013-2014.
	$4,750.00	**Wizevich.** CSU-AAUP Research Grant. "Investigation of Triassic Reptile Trackway Localities of the Western Alps, Switzerland & France."

	$500.00	**Wizevich,** M.C. and Ahern, J., Faculty-student research grant, "Paleoenvironmental Interpretation of the Triassic Reptile Trackway Localities of the Emosson Area, Switzerland."
	$2,100.00	**Wizevich,** M.C. and Ahern, J., Summer faculty-student research grant, "Investigation of carbonate beds and sediment-intrusion interactions of the New Haven Arkose Formation, Connecticut."
total	**$533,195.00**	
2014-Jan. 2015	$76,500.00	Collaborative Research: Characterizing the Regional Fluid Flow System of the Wyoming Salient, Sevier Fold-Thrust Belt: Implications for Orogenic Wedge Deformation and Propagation. Collaborative with Weber State Univ. and Univ. of Rochester (Lead institution). ($76,500- CCSU part)
total	**$76,500.00**	
Total since 2009	**$1,184,657.00**	