

Skills and concepts-driven revision of the Texas A&M B.S. Geology and B.S. Geophysics degrees

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Excellence

Overview of TAMU Geology and Geophysics Dept.

30 tenure/tenure-track faculty
(8 newly added over last 3 years)

large recent increases in undergrad majors
(currently ~550)

~100 graduate students

Service teaching : 900-1200 students/sem.

Last revision of curriculum: 1998

Formed the **Curriculum Study Group** (G&G faculty and CTE curriculum experts, students, academic advisor)

Gathered Data...

Summer/Fall 2014

**Identified Ideal Student, Program Learning outcomes
And wrote rubrics for outcomes**

Spring 2015

Discipline-specific working groups

Designed plan for courses using the developed rubrics

Summer/Fall 2015

Entire Faculty

Settled on plan of courses

Fall 2015

Create Curriculum Map

In progress

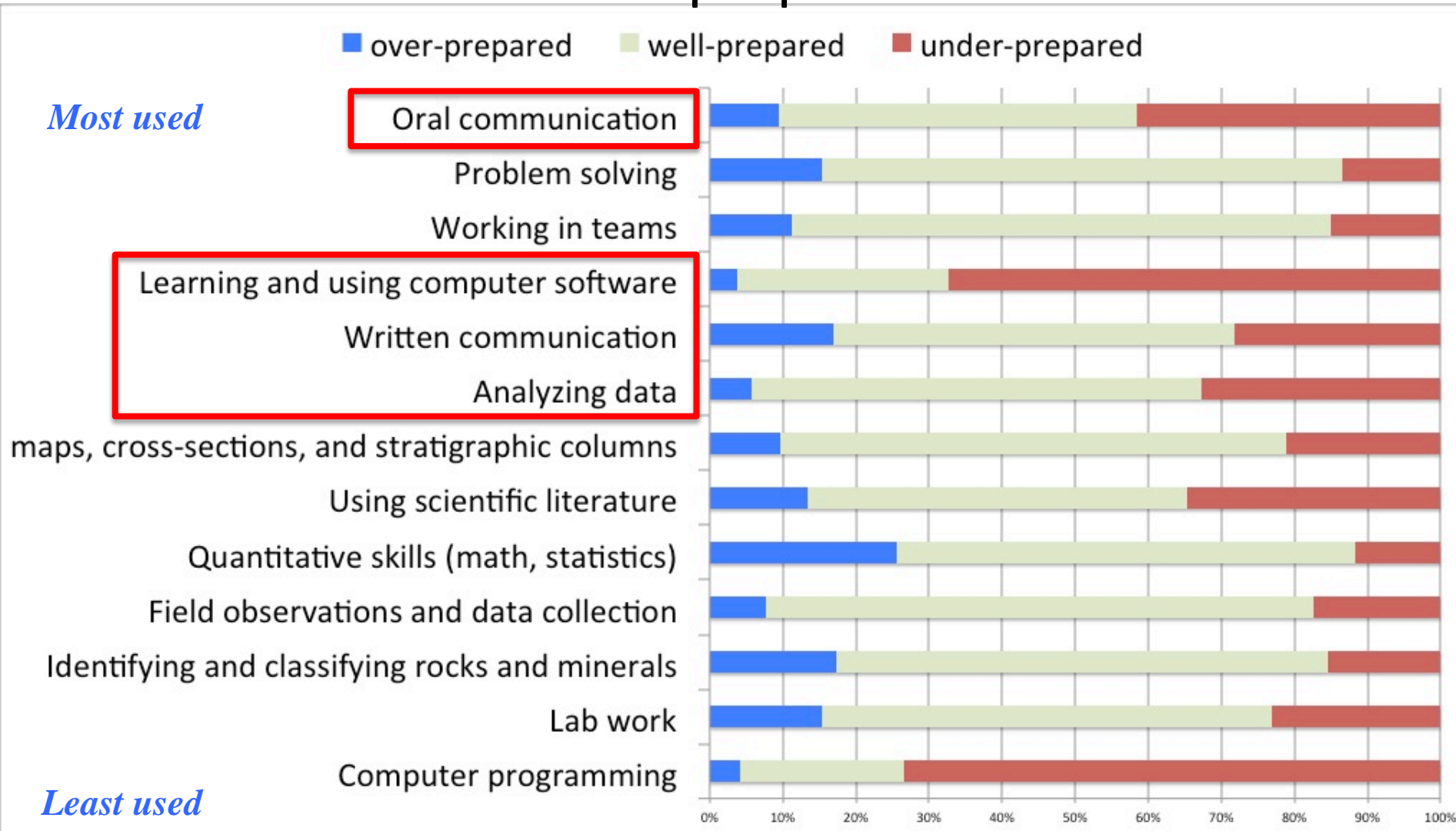
Design/Redesign courses

Spring 2016

Develop assessment plan/instruments

Former Student Survey

How prepared do students feel?



Geoscience Learning Outcomes

- 1. Earth Materials:** Evaluate relationships between Earth materials and Earth system processes
- 2. Earth Dynamics:** Infer the state and evolution of the global Earth system from fundamental physical/chemical/biological processes
- 3. Space & Time:** Recognize the variability and interdependence of Earth's systems through time and space, from the micro- to macro-scale
- 4. Modeling and Manipulating Data:** Analyze data and develop models to understand geological systems
- 5. Earth System Processes:** Interpret Earth's surface based on interaction between the atmosphere, biosphere, hydrosphere and geosphere.

Texas A&M Undergraduate Learning Outcomes (Professional Skills)

- 6. Demonstrate Critical Thinking**
- 7. Effectively communicate**
- 8. Practice Personal & Social Responsibility**
- 9. Demonstrate social, cultural and global competence**
- 10. Prepare to engage in Lifelong Learning**
- 11. Work collaboratively**

| Indicator | <i>Novice</i> | <i>Developing</i> | <i>Proficient</i> | <i>Exemplary</i> |
|----------------------|--|---|---|---|
| Global Heat Budget | Define pressure, temperature, and describe their variation within the Earth | Describe how changes in pressure and temperature affect the state and rheology of Earth materials | Identify the sources of heat in the deep Earth and the mechanisms of heat transfer | Quantify the balance of heat sources and transfer mechanisms and relate to global cooling rates and region tectonic processes |
| | Physical Geology | Structural Geology | Global Geophysics | Global Geophysics |
| Visual Communication | Define types of graphs and variables; identify structures and processes displayed in drawings of the Earth | Construct graphs to display data, and reproduce drawings that display Earth structure and dynamic | Infer relationships from visualized data. Connect graphical relationships with geological concepts. | Combine text, visualizations and quantitative arguments to communicate interpretations of geologic processes |
| | Physical Geology Geol. Communication | Geol. Communication Field Methods Structural Geology | Global Geophysics Structural Geology | Global Geophysics Senior Capstone Elective |

B.S. GEOLOGY

Year 4

Senior Capstone
Elective

Tech. electives

Year 3

Summer Field Camp

Structural
Geology

Geobiology

Technical
electives

Global Geophysics

Year 2

Igneous/metamorphic
Petrology

Sedimentology

Electricity

Differential
Equations

Geological
Communication

Mineralogy

Field Methods

Mechanics

Calculus III

Year 1

Historical Geology

Freshman
Seminar

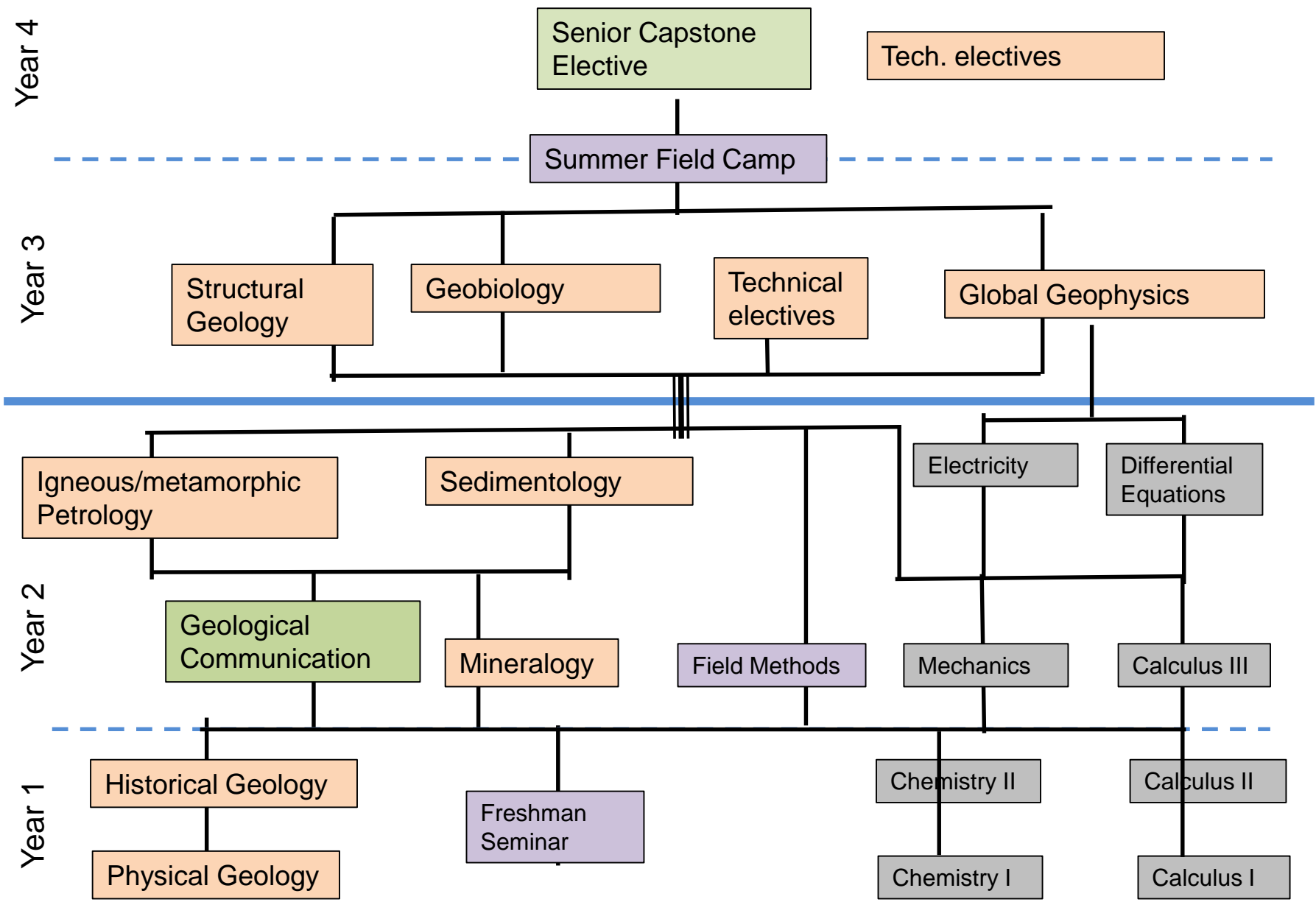
Chemistry II

Calculus II

Physical Geology

Chemistry I

Calculus I



Lessons Learned (so far)

Get the right mix of people involved from the start

Keep touching base with reality/constraints

Bring (almost) everyone along