AGI ad hoc Committee on Academic Geoscience Program Classification

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Graduate (accredited program)

Pass Exam

Get a job

Pass exam

Licensed

Establish reputation

Get a job

Typical Science Approach

Typical Engineering Approach
Outline

- Licensing aspects
- Certification
- Education
  - Range of programs
  - Accreditation styles
- Constituent needs
  - Employers, Programs, and Students
- Classification proposal under discussion
Geological Licensure (USA)

- Engineering (by states; minor variations)
  - ABET-accredited program
  - FE (Fundamentals of Engineering) Exam
  - ~4 years experience + references
  - PE (Professional Engineering) Exam

- Science (varies tremendously by state)
  - Degree with >30 credits in discipline
  - ~5 years experience + references
  - Examination (often “ASBOG®”)
    - ASBOG® = National Association of State Boards of Geology
## Maze of Licensing Requirements

- Page 1 of; the first eight states, alphabetically:

<table>
<thead>
<tr>
<th>State</th>
<th>CEU Requirements</th>
<th>Number of CEUs</th>
<th>CEU Requirements</th>
<th>Language and Time Frame</th>
<th>Requirements of CEU Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>Yes</td>
<td>543</td>
<td>Yes</td>
<td>30 hours per semester</td>
<td>Any Professional Society sponsored event or Educational offering by an Educational Institution that involves Improvement of Professional Practice in Geosciences</td>
</tr>
<tr>
<td>Alaska</td>
<td>Yes</td>
<td>545</td>
<td>Yes</td>
<td>Under Consideration</td>
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<tr>
<td>Arkansas</td>
<td>Yes</td>
<td>780</td>
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<td></td>
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<td>California</td>
<td>Yes</td>
<td>5046 PGs, 593 CEs, 201 Courses, 30 HCUs</td>
<td></td>
<td></td>
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<tr>
<td>Colorado</td>
<td>Yes</td>
<td>273 Lit, Tech, Professional</td>
<td></td>
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<td>Connecticut</td>
<td>Yes</td>
<td>273 Lit, Tech, Professional</td>
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<td>Delaware</td>
<td>Yes</td>
<td>397</td>
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</table>

Source for this example of CEU requirements: AIPG website  www.aipg.org
Professional Certification

- Not necessarily a license
- Recognition of skills
  - By an agency of some sort
    - AIPG: Certified Professional Geologist
    - AAPG: Certified Petroleum Geologist (Geophysicist)
  - By an academic unit
  - Varying levels of acceptance and recognition by other agencies or groups
Educational Aspects

- Only Bachelor’s Degrees considered here...
- Difficulty in assessing quality of a graduate’s preparation and skills
  - Due to range of programs
- Two examples of programs are shown next...
Liberal Arts:

- Nine courses in geology
  - Physical, Historical, Structural, Mineralogy, Sed/Strat, Geomorph, and three other geology courses of choice
- One course in Chemistry
- One other course in Science OR Math
  - Advice* may be given for additional, non-required, courses, for those intending to pursue a profession.

*students may or may not believe that they have been given this advice
Example 2 of Range of Programs

- Graduate School Ready:
  - Core Geology courses
    - 2 semesters intro, structural, mineralogy
    - Field (summer) course
    - Five more elective geology courses required
    - Senior project
  - 3 semesters Calculus
  - 2 semesters Physics
  - 1 semester Chemistry
... students do not know what preparation they are getting;
... employers do not know what preparation the students have received; and
... licensing agencies find it difficult to assess the applicants’ educational backgrounds.

Accreditation might solve these problems...
In 2007...a survey that GSA circulated to department chairs only. ... it concluded with a direct question:

Are you in favor of some type of formal accreditation of academic programs?

Department chairs responded almost evenly: 51% No and 49% Yes.

... survey distribution was expanded to include all sectors of geoscience employment. ... the 2008 survey concluded with ... :

Are you in favor of some type of formal accreditation of academic programs?

The 2008 survey response shows 79% in favor and 21% opposed.
1. A coalition of societies should establish a working group to be charged with developing a system of accreditation for undergraduate programs in the geosciences. ...

2. The coalition should ask the American Geological Institute (AGI) to provide coordination for the effort. AGI represents a broad cross section of geoscience organizations and is the natural lead institution for this effort.

Subsequently, nine other societies joined GSA in requesting AGI to lead the effort to investigate the possibility of accreditation of geoscience programs.
“Accreditation restricts departments to matching their curricula to externally imposed standards. . . .”

“...At the undergraduate level, no one wins with accreditation—not the students, not the departments, not the profession, not society. . . .”

“Two directions offer promising alternatives to accreditation. The first is a growing movement to identify the ideas and concepts that characterize geoscience literacy and to publish this synthesis (Earth Science Literacy Initiative, www.earthsciceliteracy.org). The second is creation of community-developed standards (not accreditation), which might usefully include big ideas, skills, and modes of inquiry that lead to positive student learning outcomes and are of practical benefit in all geoscience careers.”
Accreditation Styles (USA)

- Geoscience programs are not accredited
  - The institutions are accredited, but not programs
  - Departments may have reviews, but not programs

- Engineering programs are accredited
  - Geological, Mining, and Petroleum Engineering
- Atmospheric programs can self-accredit

- A range of styles exists for other disciplines
What would be the objectives of any system to “accredit” geoscience programs in the US?

Next slides examine goals, based on constituent needs...
Constituent Needs: Employers

- Licensed experts required to sign documents.
- Evaluation of preparation is often difficult.
  - Recall the examples of different programs.
  - There are hundreds of programs...
- Employers, Licensing agencies, all find it difficult to deal with the lack of identification of program and student qualifications.
Constituent Needs:
Academic Programs

- Recognition of their qualities
- Attraction of appropriate students
- Matching of recruiters
- Definition within the institution
  - Needs to be identified and remedied
  - Multiple programs identified within departments
- Fears
  - Will not live up to expectations, may be closed
  - Outside influence over activities
Many students do not recognize that there are different types of programs
  - They may or may not understand the preparation provided by their program
- Better career preparation
  - More aligned with their desires and needs
- Encouraged to take “tougher” courses
  - Better preparing them for a professional career
  - While allowing for “general” or “liberal” programs
“Classification” rather than accreditation
For Bachelor’s degree programs only
All programs should be able to fit
Wide range of classifications
  - Probably a matrix, not a linear spectrum
  - Should be limited in number of classifications
    - In order to be meaningful
  - Multiple programs within departments may be classified separately (options; technical emphasis)
Under auspices of AGI

- American Geosciences Institute
  - federation of 50 societies
- 20 members, selected by member societies
- Professionals, Faculty, and Students
  - With wide variety of experience
- Only recently formed...
One model... being proposed

- Programs apply for appropriate classification;
  - (Departments may submit more than one program)
- Agency (AGI?) reviews application;
  - (May request supplementary information)
  - (No site visit)
- Application can be:
  - Accepted (5 years)
  - Rejected (with comments and suggestions)
    - For improvement or other classification may be appropriate
What would happen next?

- Programs can “advertise” their classification
- Students will know what they are getting...
  - ... and can compare with other classifications
    - ... on a general website
- Students graduate from a classified program
  - Recruiters, employers, and graduate programs...
    - ...understand the type of preparation the student has.
Additional Outcomes

- Departments may use their programs’ classification as leverage with administration:
  - “Our program is classified as X, but we want to add program Y, and need your support to achieve this.”
- Students will understand their options better
  - Rather than taking minimum courses required, they will know that taking other courses qualifies them for a different classified program, which may be better aligned with their career plans.
Establishing a coherent set of program classifications that fit the broad range.
Getting administrative cooperation from Departments and their Chairs or Heads.
It is never easy changing anything in academia...
  “How many academics does it take to change a light bulb?”
Current Status

- Committee has met by videoconference
- Reviewed UK model of accreditation
- Will soon review one program’s pursuit of ABET
- Will evaluate and discuss Classification proposal

- Comments, criticism, suggestions:
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