



## Part III- Using the ASBOG® Fundamentals of Geology (FG) Examination as a Geosciences Program Assessment and Modification Tool





# History of ASBOG's Academic Assessment

- **2008**- Special Committee on Education and Outreach formed to evaluate the use of the FG for academic assessment
- **2008**- FG scantron (bubble sheet) was modified to collect demographic data for academic assessment
  - Including AGI code for undergraduate institution
  - Year of graduation
  - Highest degree
  - Area of specialization

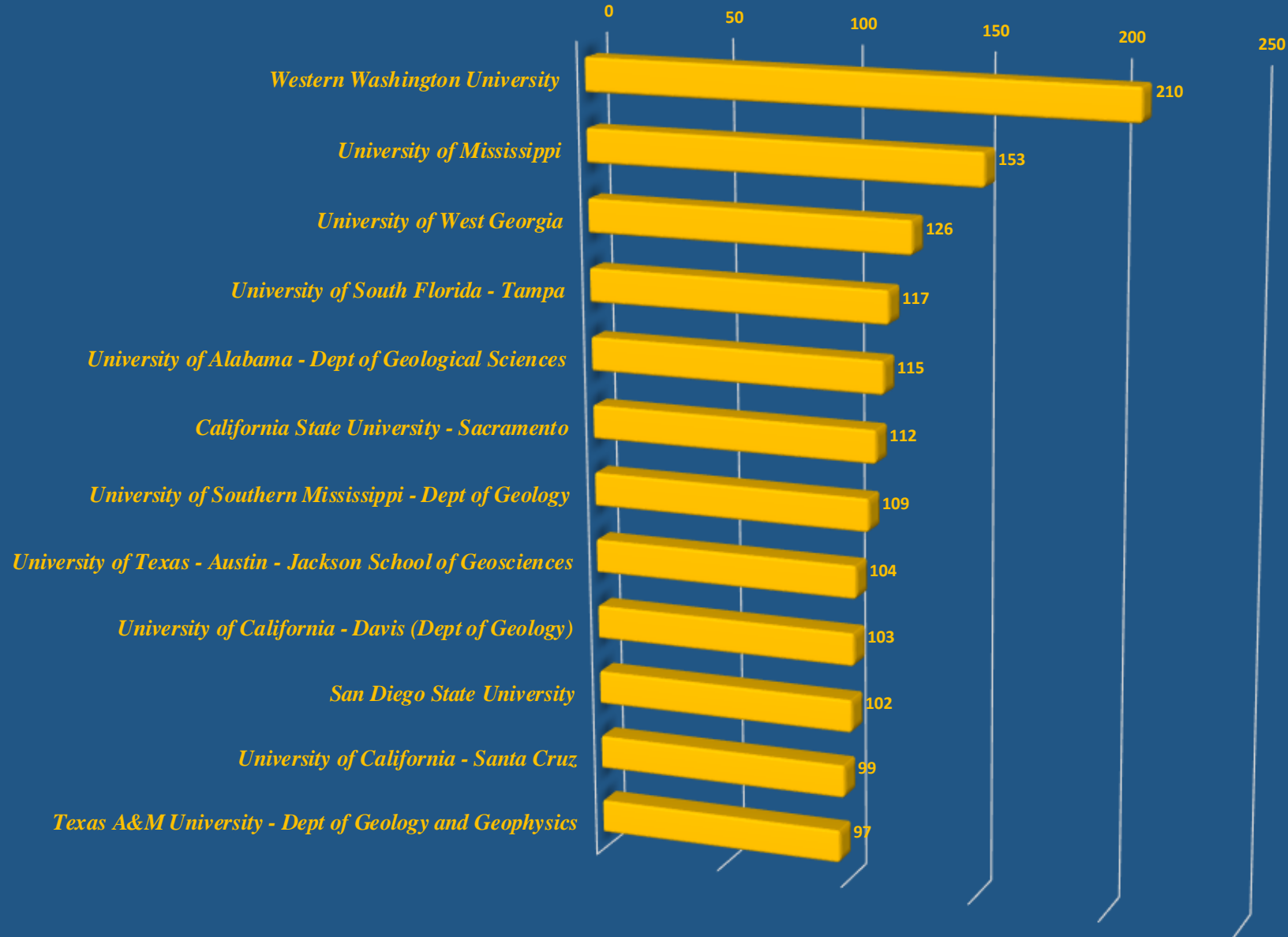


# History of ASBOG's Academic Assessment

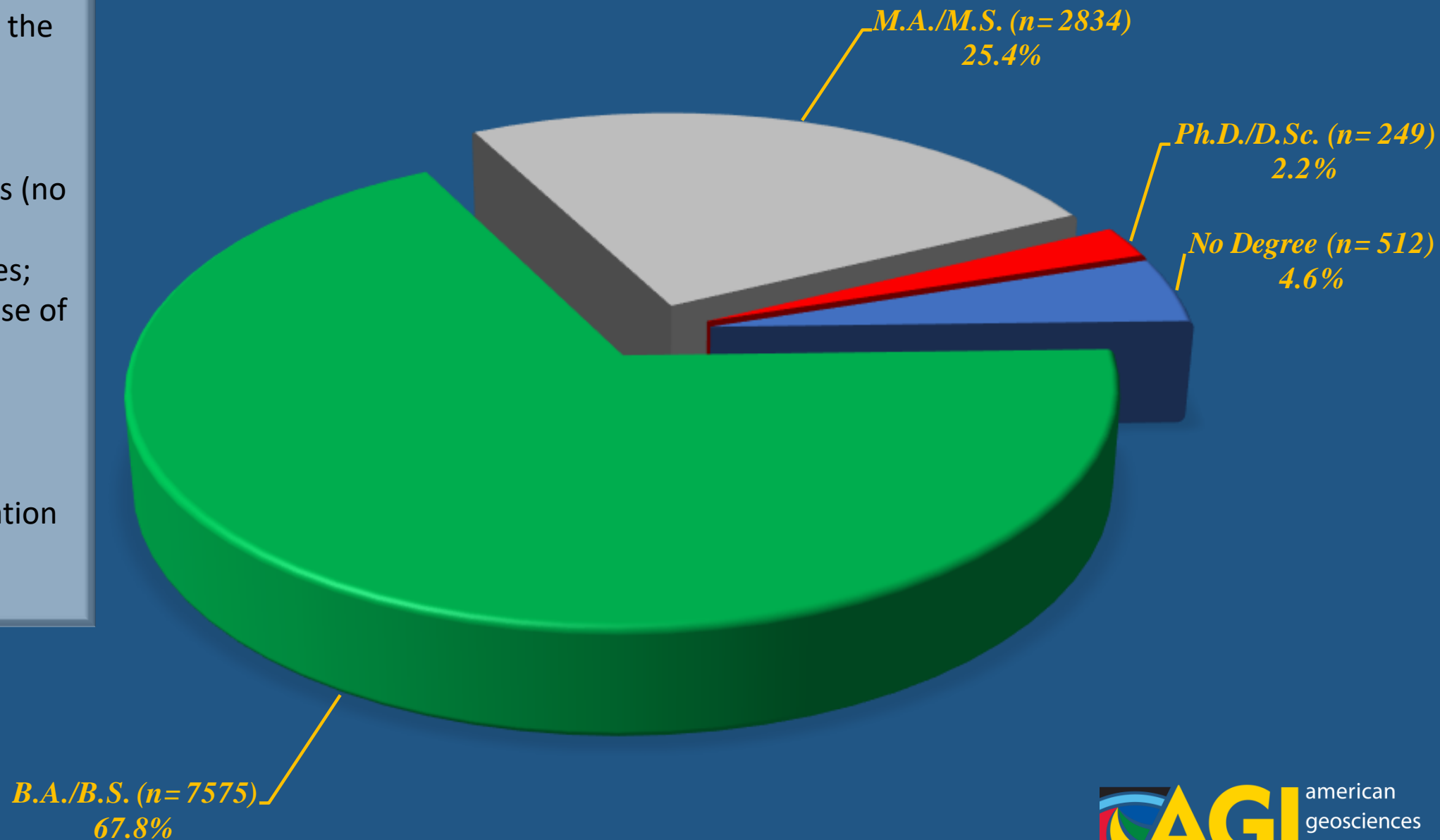
- **2010**- Assessment letter sent to academic departments with geosciences programs; \$\$ for assessment data ☹️
- **2012**- Education and Outreach Committee renamed Academic Assessment Committee
- **2012**- Developed CPAT for comparing geoscience programs to a national statistical data
- More than 215 universities/schools eligible for CPAT (>10 exams in CPAT database)
- Currently 42 universities using CPAT



# Top 12 Universities by FG Examination Volume



More than 72% of all candidates taking the Fundamentals of Geology (FG) examination are graduating seniors (no degree) and/or B.A./B.S. graduates; allowing for the use of this national examination for undergraduate program review, program modification and curriculum assessment.

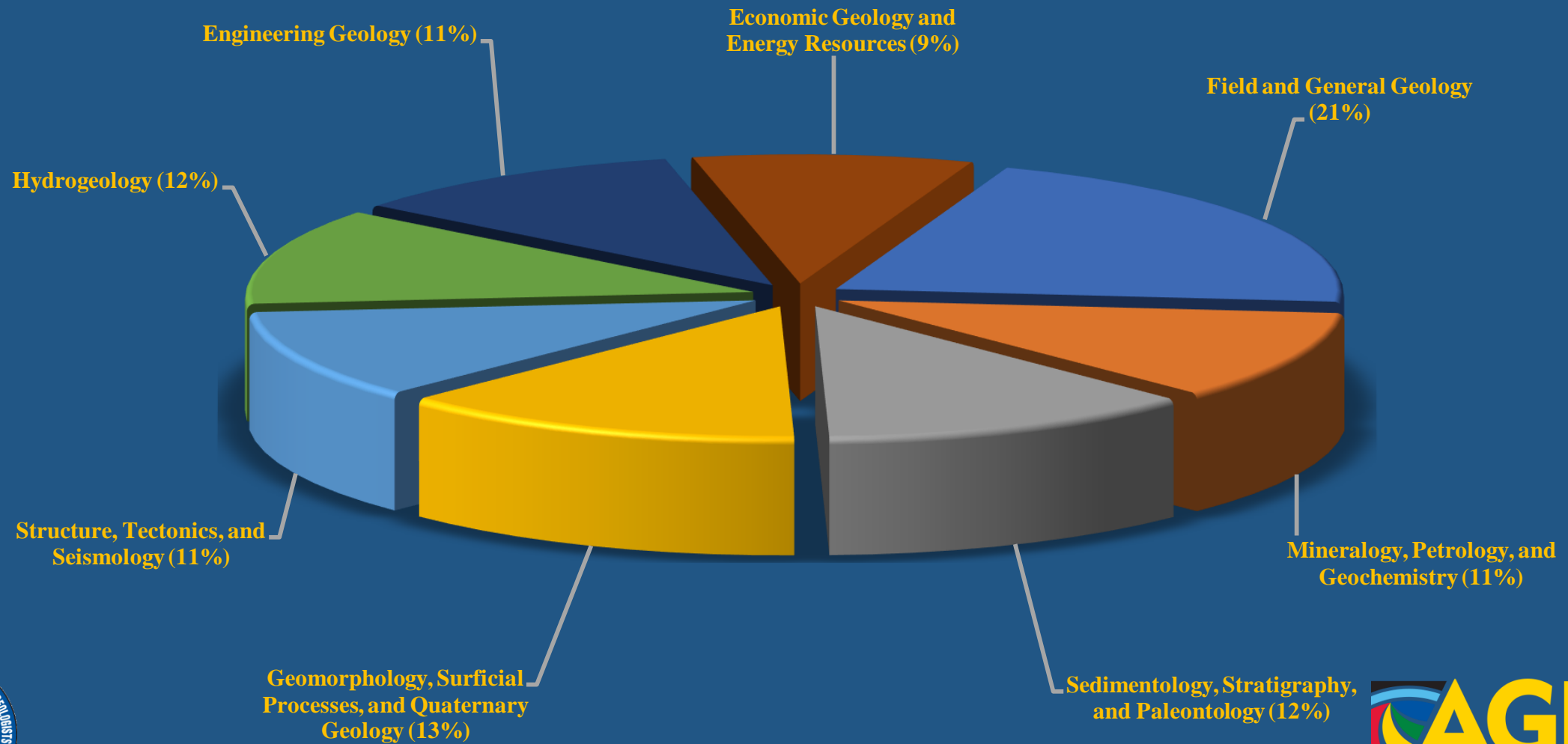


# Using the FG as an Assessment Tool

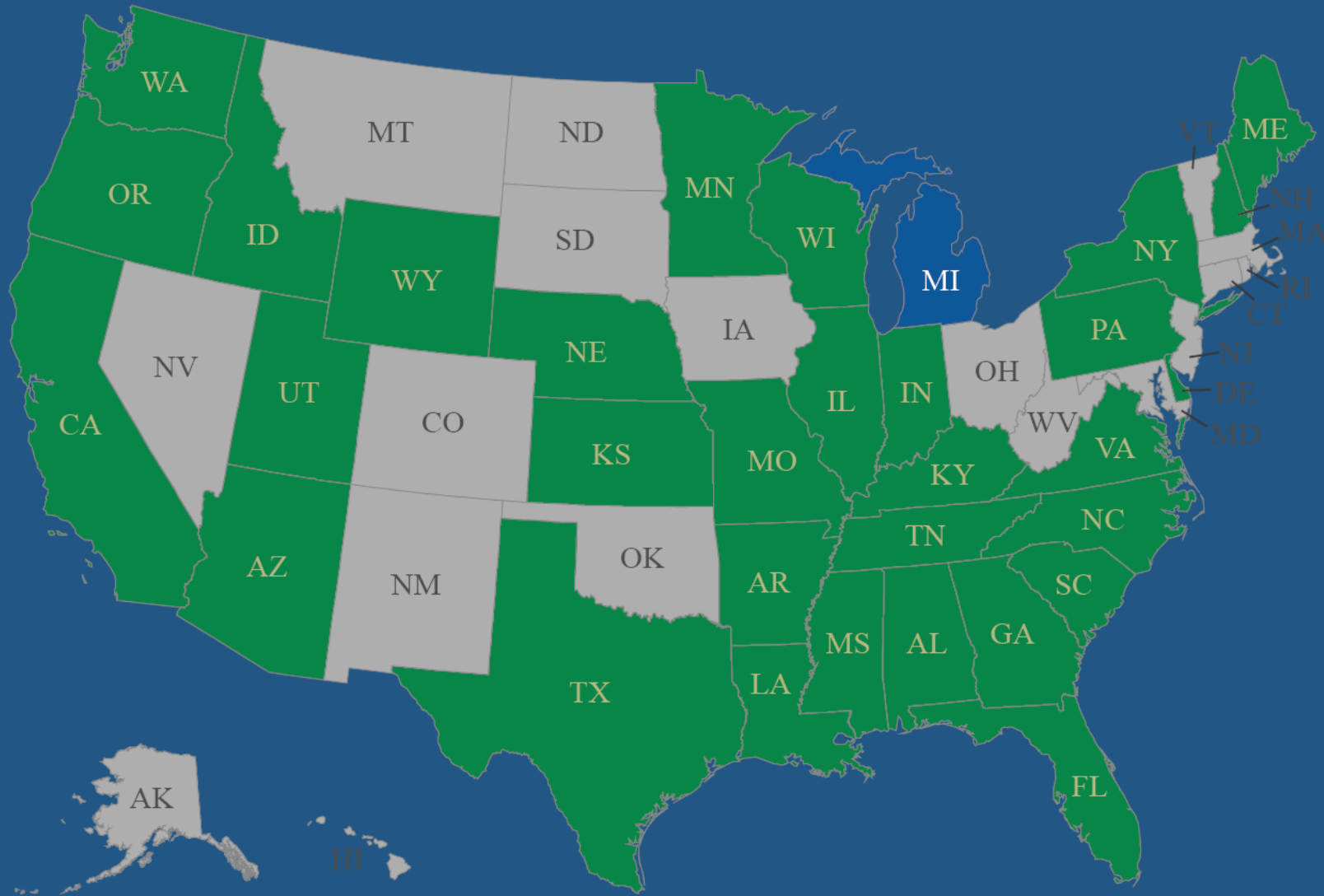
- ✓ ***Regional Accreditation and Program Review***  
*i.e.*, Middle States Commission on Higher Education, New England Association of Schools and Colleges (NEASC), Northwestern Commission on Colleges and Universities (NWCCU), Higher Learning Commission (HLC), **Southern Association of Colleges and Schools (SACS)**, and Western Association of Schools and Colleges (WASC)
- ✓ ***Curriculum Development***
- ✓ ***Curriculum Assessment***
- ✓ ***Curriculum Modifications***
- ✓ ***Exit Exam vs. Assessment Exam?***



*ASBOG® Task Analysis Survey*  
*Fundamentals of Geology Blueprint- Domain Percentages*



# United States & Puerto Rico



- ASBOG Member Board Regulatory State (MBR) (32)
- FG Testing Only State (FGTO) (1)
- Non-Regulatory State (NRS) (18)





# Curriculum Performance Assessment Tool (CPAT)

- Virtual demonstration of CPAT

ASBOG® Fundamentals of Geology Assessment Graphing Database

*National Association of State Boards of Geology  
Fundamentals of Geology (FG)  
Graphing Database*

*Import Candidate Demographic Data*

*Import Candidate Domain Data*

*Select AGI Code for Institutional Assessment*


*Graphing FG Data for selected AGI Code*

*Report FG Data for selected AGI Code*

*Database Relationship Report*

*ASBOG® Web Site*

*ASBOG Domains and Task Statements*

 *National Association of State Boards of Geology*

Record: 1 of 1 | No Filter | Search

Form View



# Curriculum Performance Assessment Tool (CPAT)

- Virtual demonstration of CPAT

ASBOG® Fundamentals of Geology Assessment Graphing Database

Select AGI Institution for Graphs and Reports

Chimney Rock University

AGI Code No. 861

Goto Graphing Menu Goto Report

ASBOG® National Association of State Boards of Geology

Record: 1 of 782 No Filter Search

Form View



# Curriculum Performance Assessment Tool (CPAT)

- Virtual demonstration of CPAT

ASBOG® Fundamentals of Geology Assessment Graphing Database

**Chimney Rock University**

Graphs provide summary statistics for your school's performance on the Fundamentals of Geology (FG) Examination. To view your department's overall summary statistics and to view your department's performance on the FG exam, select the appropriate graph below:

**Z-Scores & Percentiles**

- Z-Scores for all Data
- Percentiles for all Data

**% Passing by Degree Year**

- Candidate's Primary Practice vs. ASBOG® Domains
- Percent Passing FG by Degree Year

**Scaled vs % Correct**

- Scaled Score vs. Number of Attempts
- Scaled Score vs Percent Correct
- Percent Correct for all Students
- Average % Correct by year all Content Domains

Go to Domain-Specific Assessment Analysis

ASBOG® National Association of State Boards of Geology

Record: 1 of 1 | No Filter | Search

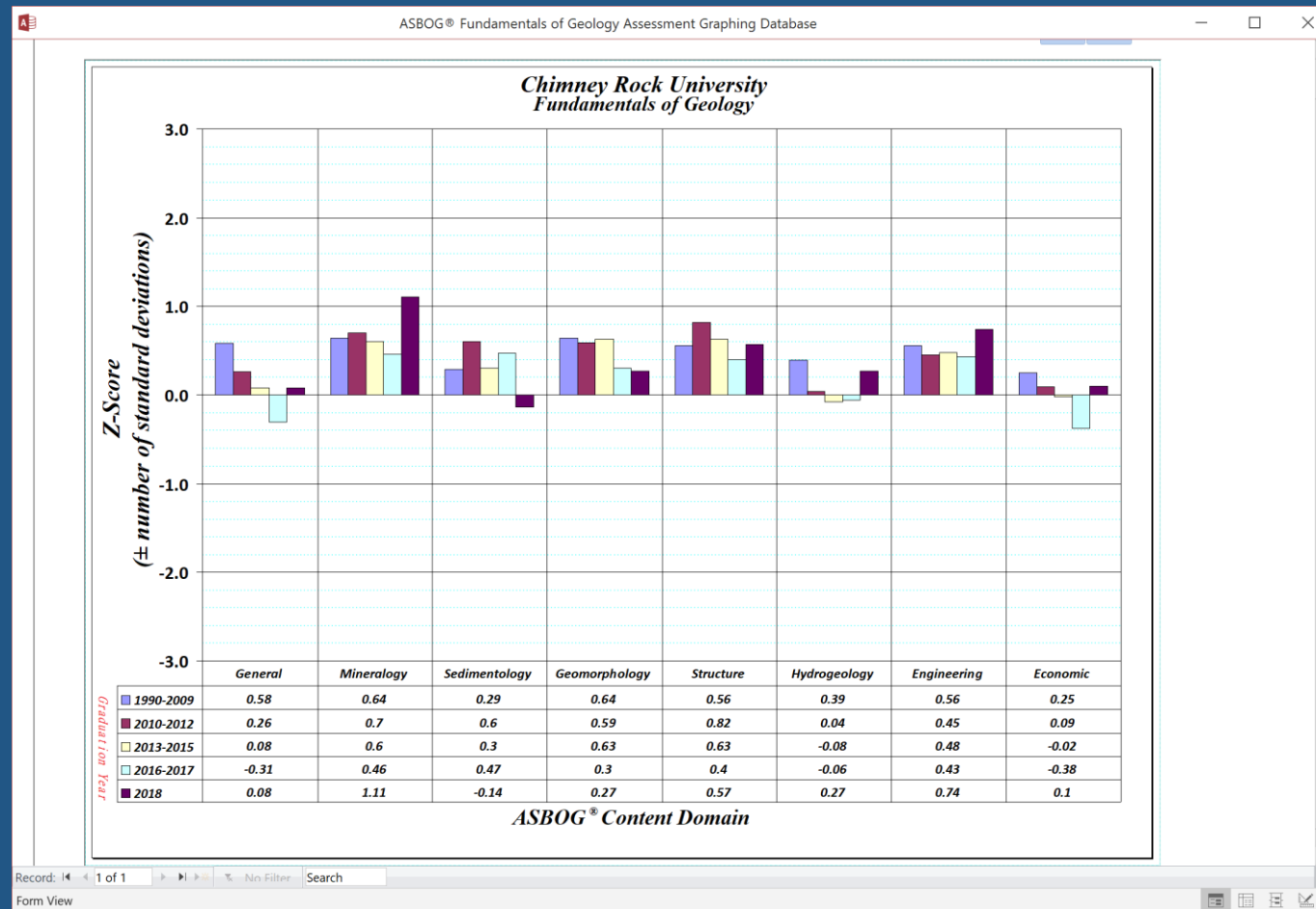
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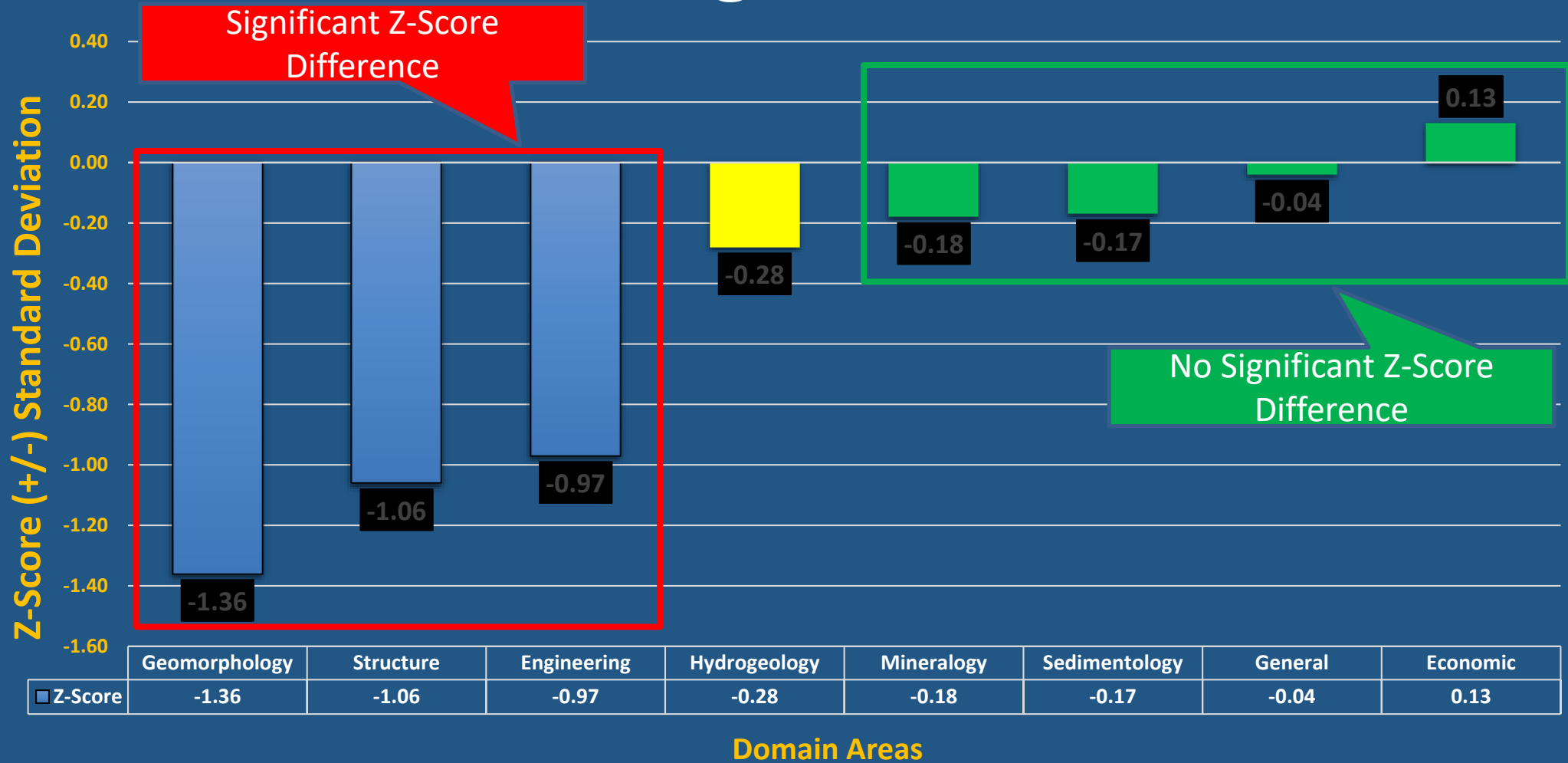


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- Virtual demonstration of CPAT

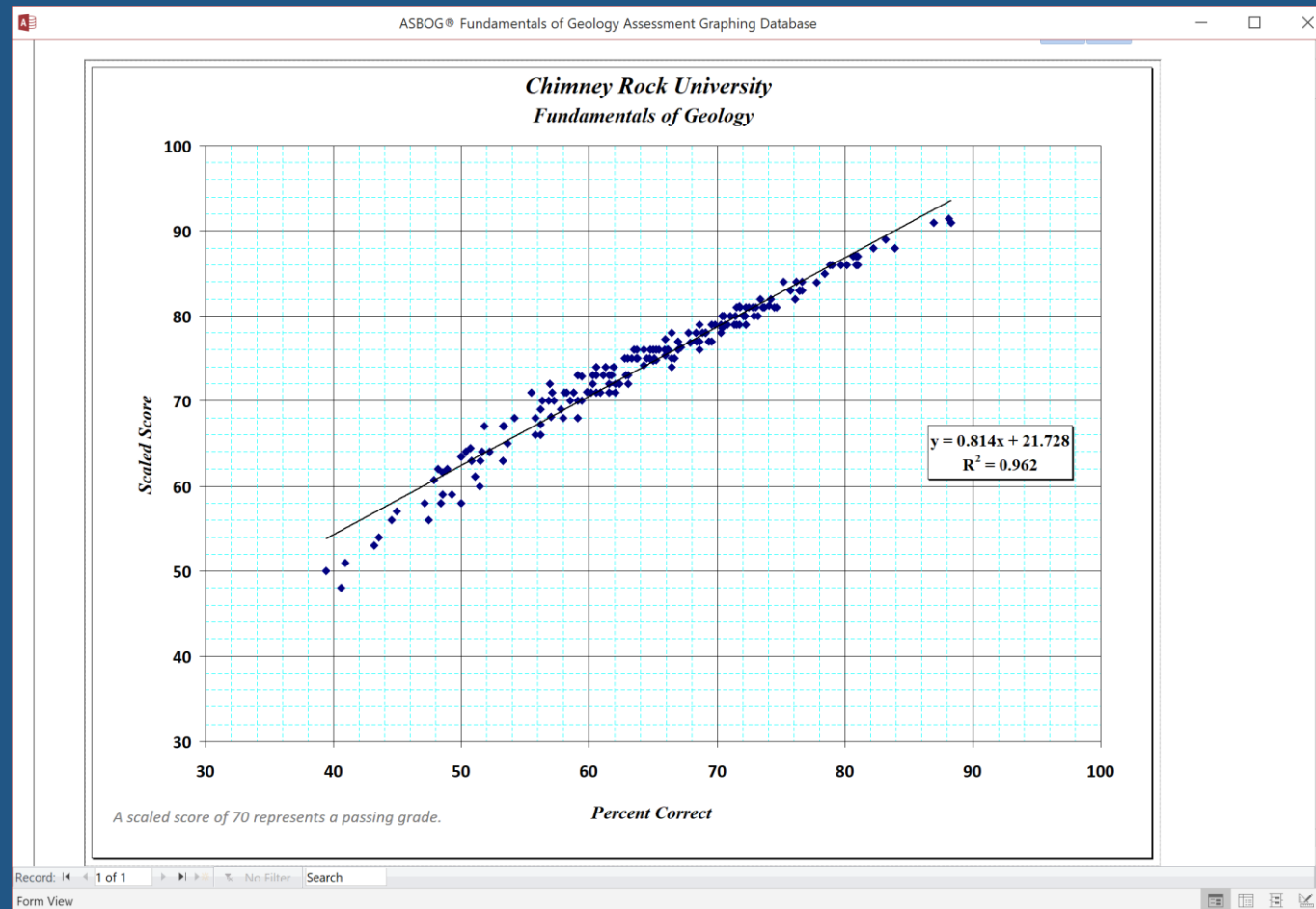


# Using Z-Scores



# Curriculum Performance Assessment Tool (CPAT)

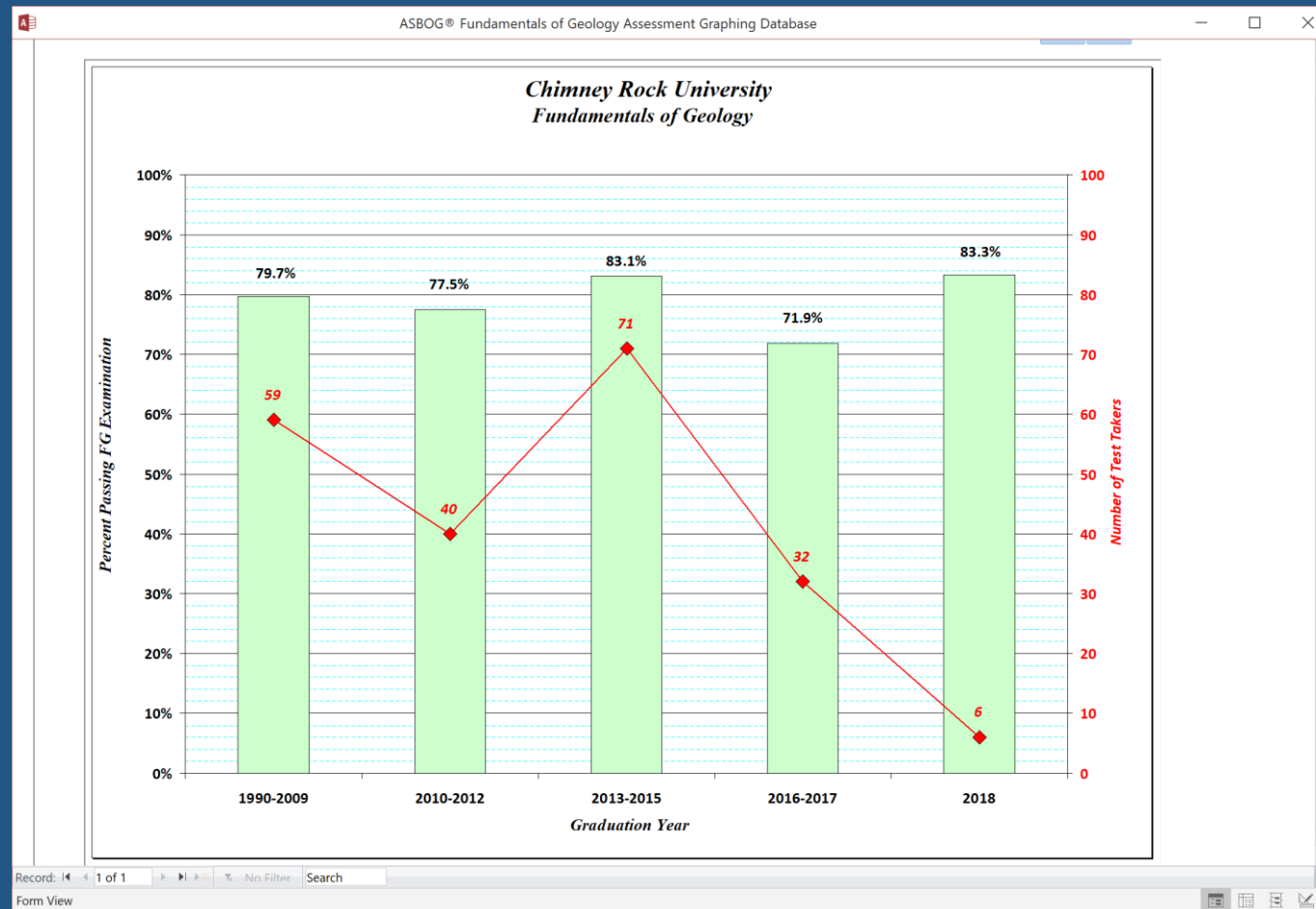
- Virtual demonstration of CPAT





# Curriculum Performance Assessment Tool (CPAT)

- Virtual demonstration of CPAT



# Curriculum Performance Assessment Tool (CPAT)

- Virtual demonstration of CPAT

The screenshot shows a web application window titled "ASBOG® Fundamentals of Geology Assessment Graphing Database". The header displays "Chimney Rock University". Below the header, a paragraph states: "The following graphics provide summary statistics for your schools performance on the Fundamentals of Geology (FG) Examination. These dataset include multiple test attempts by test takers from your school. To view your department's overall summary statistics and performance on the FG exam, select the appropriate graph below:". There are nine buttons arranged in two columns. The left column contains: "Z-Scores for all Data", "Percentiles for all Data", "Scaled Score vs. Number of Attempts", and "Scaled Score vs Percent Correct". The right column contains: "Candidate's Primary Practice vs. ASBOG® Domains", "Percent Passing FG by Degree Year", "Percent Correct for all Students", and "Average % Correct by year all Content Domains". At the bottom center, there is a red button labeled "Go to Domain-Specific Assessment Analysis". A green arrow points from a green box labeled "Domain Assessment" to this red button. The footer of the window shows the ASBOG logo and the text "National Association of State Boards of Geology". The bottom status bar includes "Record: 1 of 1", "No Filter", and a "Search" field.

ASBOG® Fundamentals of Geology Assessment Graphing Database

Chimney Rock University

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Z-Scores for all Data

Candidate's Primary Practice vs. ASBOG® Domains

Percentiles for all Data

Percent Passing FG by Degree Year

Scaled Score vs. Number of Attempts

Percent Correct for all Students

Scaled Score vs Percent Correct

Average % Correct by year all Content Domains

Go to Domain-Specific Assessment Analysis

Domain Assessment

ASBOG National Association of State Boards of Geology

Record: 1 of 1 No Filter Search



# Curriculum Performance Assessment Tool (CPAT)

- Virtual demonstration of CPAT

ASBOG® Fundamentals of Geology Assessment Graphing Database

**Chimney Rock University**

*The Fundamentals of Geology Examination is broken down into 8 content (blueprint) domains. This dataset includes multiple test attempts by test takers from your school. To view your department's test takers, first select the area of assessment, then select a test attempt option, then select the highest degree, and then choose from the chart/plot types below:*

**Select Area of Assessment** Field and General Geology

**Select Test Attempts-**

☐ First  
☐ First and Second  
☐ First, Second, and Third  
☒ All Attempts

**Highest Degree-**

☐ No Degree  
☐ BA/BS  
☐ MA/MS  
☐ Ph.D  
☒ No Degree/BA/BS

Normalized Ratio Score of Selected Domain

Normalized Ratio Score of Selected Domain w/ n

Percent Above/Below National Average


Percent Above/Below National Average w/ n

Ratio Score Scatter Plot of Selected Domain

Ratio Score Scatter Plot of Selected Domain w/ n

Ratio Score Bar Graph of Selected Domain

Hi-Lo-Mean Graph of Selected Domain

 **ASBOG** National Association of State Boards of Geology

Record: 1 of 1 | No Filter | Search

Form View





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| Field and General Geology                                  | A |
|--|---|
| Mineralogy, Petrology, and Geochemistry                    | B |
| Sedimentology, Stratigraphy, and Paleontology              | C |
| Geomorphology, Surficial Processes, and Quaternary Geology | D |
| Structure, Tectonics, and Seismology                       | E |
| Hydrogeology   | F |
| Engineering Geology  | G |
| Economic Geology and Energy Resources                      | H |

Percent Above/Below National Average w/ n

Ratio Score Scatter Plot of Selected Domain

Ratio Score Scatter Plot of Selected Domain w/ n

Ratio Score Bar Graph of Selected Domain

Hi-Lo-Mean Graph of Selected Domain

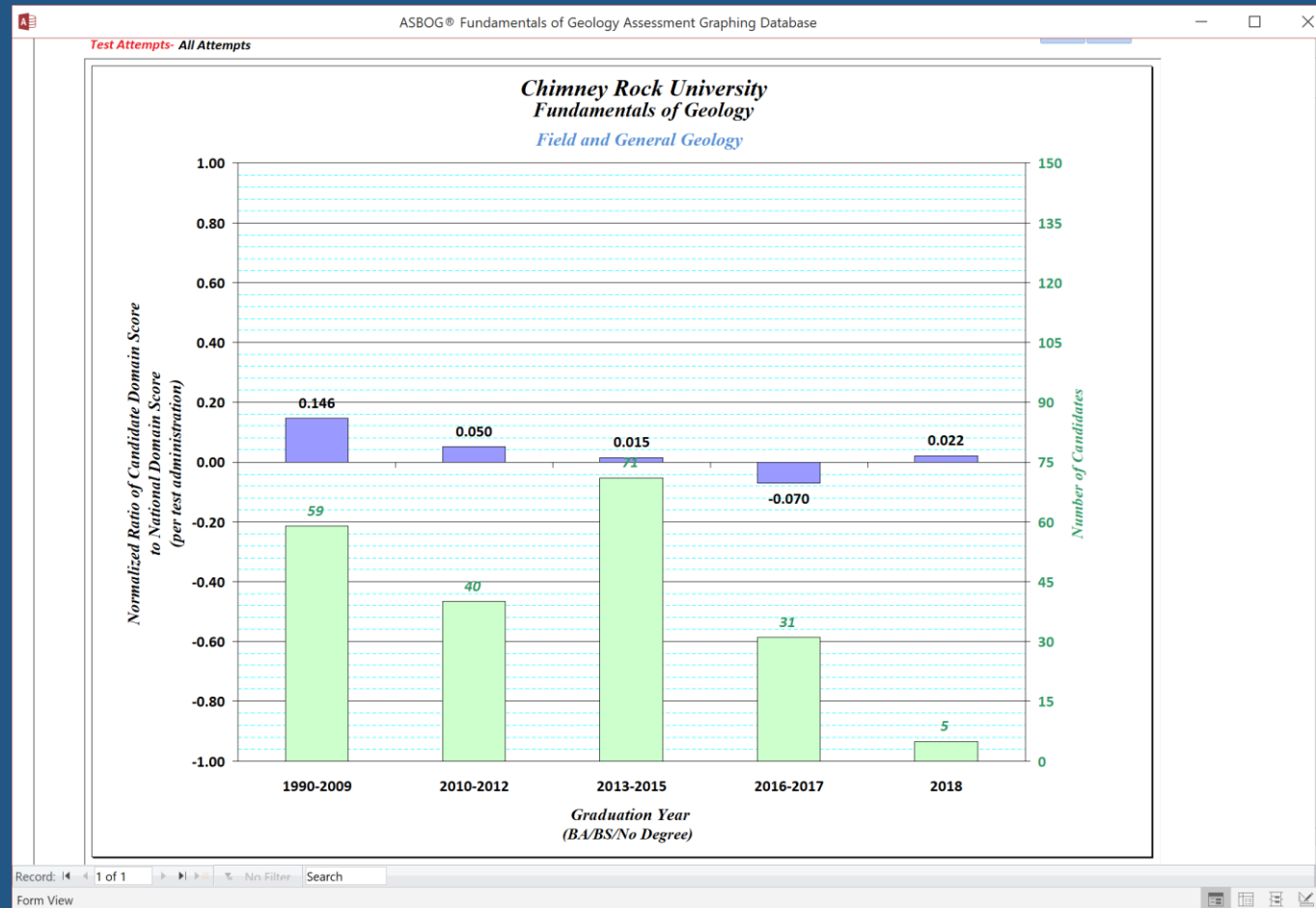
ASBOG® National Association of State Boards of Geology

Record: 1 of 1  
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Ratio Score Scatter Plot of Selected Domain

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Ratio Score Bar Graph of Selected Domain

Hi-Lo-Mean Graph of Selected Domain

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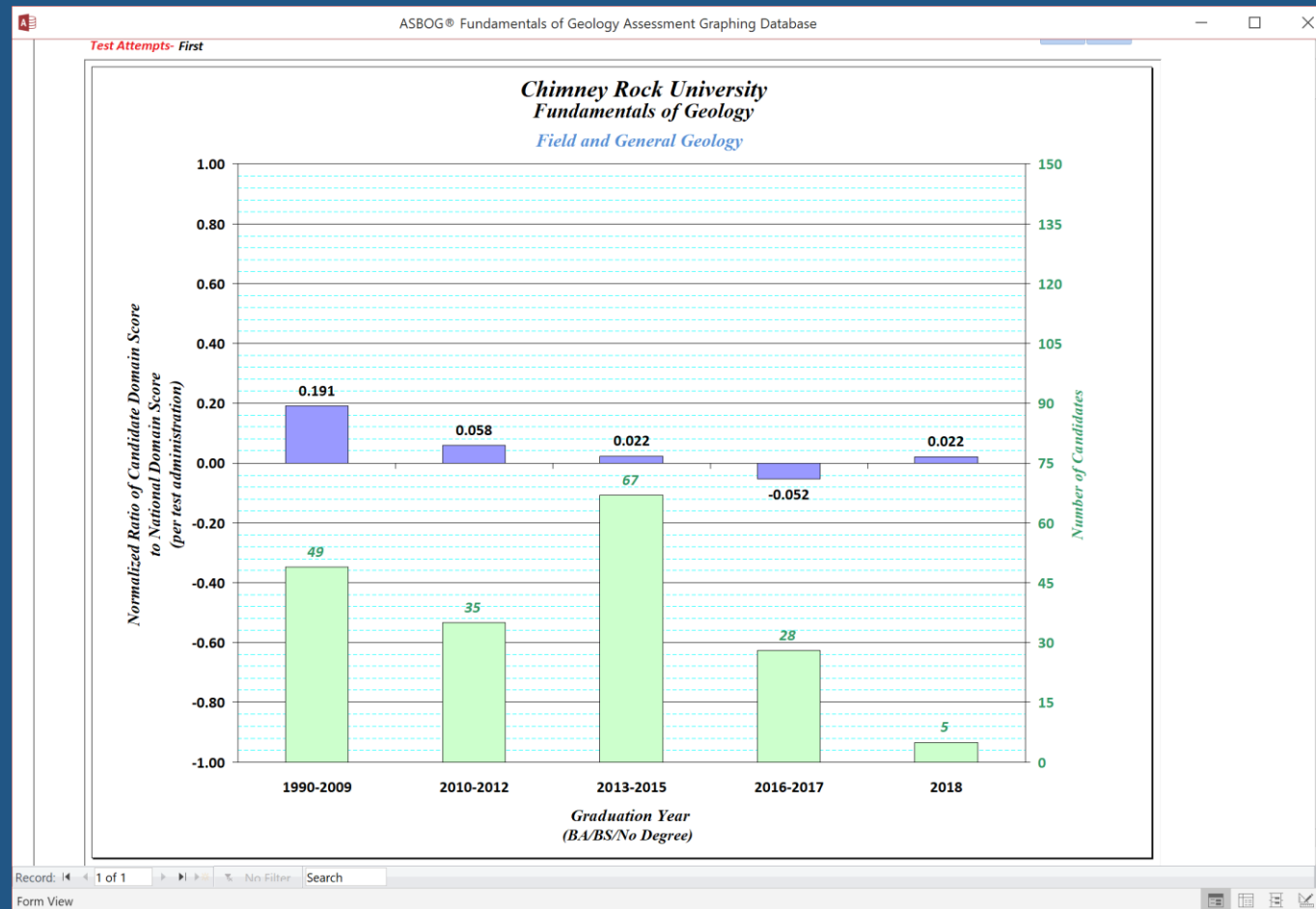
Form View





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Select AGI Institution for Graphs and Reports

Chimney Rock University

AGI Code No. 861

Goto Graphing Menu

Goto Report

Aggregate Data

ASBOG National Association of State Boards of Geology

Record: 1 of 782 No Filter Search

Form View



# Curriculum Performance Assessment Tool (CPAT)

- Virtual demonstration of CPAT

ASBOG® Fundamentals of Geology Assessment Graphing Database

### Summary Report

**Chimney Rock University**

| Student ID | Primary Practice      | Degree   | Form ID | 1A | 1B | 1C | 1D | 1E | 1F | 1G | 1H  | No. Correct | % Correct | Scaled |
|------------|-----------------------|----------|---------|----|----|----|----|----|----|----|-----|-------------|-----------|--------|
| 267        | Environmental Geology | BA or BS | 803     | 57 | 47 | 75 | 73 | 72 | 56 | 83 | 50  | 77          | 64        | 75     |
| 268        | Geologic Hazards      | BA or BS | 803     | 48 | 53 | 56 | 55 | 56 | 63 | 67 | 60  | 68          | 56        | 69     |
| 269        | Environmental Geology | BA or BS | 803     | 57 | 29 | 56 | 73 | 44 | 38 | 33 | 50  | 57          | 47        | 58     |
| 274        | Other                 | BA or BS | 803     | 76 | 59 | 69 | 73 | 72 | 63 | 67 | 40  | 80          | 66        | 76     |
| 651        | Geomorphology         | BA or BS | 810     | 90 | 67 | 89 | 92 | 78 | 82 | 92 | 67  | 102         | 82        | 88     |
| 654        | Environmental Geology | BA or BS | 810     | 60 | 33 | 67 | 83 | 83 | 59 | 58 | 44  | 76          | 61        | 74     |
| 906        | No Primary Area       | BA or BS | 903     | 68 | 42 | 53 | 67 | 63 | 33 | 58 | 44  | 65          | 54        | 68     |
| 909        | Environmental Geology | BA or BS | 903     | 64 | 58 | 53 | 42 | 44 | 33 | 58 | 78  | 64          | 53        | 67     |
| 968        | Environmental Geology | BA or BS | 910     | 67 | 58 | 53 | 42 | 44 | 67 | 58 | 67  | 72          | 57        | 71     |
| 1026       | Engineering Geology   | BA or BS | 910     | 76 | 53 | 76 | 33 | 56 | 56 | 75 | 56  | 77          | 61        | 73     |
| 1027       | Environmental Geology | BA or BS | 910     | 76 | 63 | 47 | 58 | 78 | 50 | 50 | 67  | 78          | 62        | 74     |
| 1028       | No Primary Area       | BA or BS | 910     | 57 | 68 | 59 | 42 | 44 | 56 | 67 | 56  | 71          | 56        | 70     |
| 1030       | No Primary Area       | BA or BS | 910     | 52 | 63 | 59 | 67 | 67 | 56 | 50 | 78  | 76          | 60        | 73     |
| 1033       | Geomorphology         | BA or BS | 910     | 71 | 95 | 65 | 67 | 61 | 78 | 83 | ### | 96          | 76        | 84     |
| 1036       | Environmental Geology | BA or BS | 910     | 52 | 53 | 53 | 50 | 61 | 61 | 67 | 67  | 72          | 57        | 71     |
| 1037       | Other                 | BA or BS | 910     | 62 | 42 | 35 | 42 | 61 | 61 | 42 | 56  | 64          | 51        | 63     |
| 1151       | Engineering Geology   | BA or BS | 910     | 86 | 95 | 76 | 50 | 78 | 56 | 75 | 89  | 96          | 76        | 84     |
| 1273       | Field Geology         | BA or BS | 1003    | 86 | 47 | 89 | 75 | 56 | 81 | 83 | 78  | 92          | 74        | 82     |
| 1433       | Engineering Geology   | BA or BS | 1003    | 73 | 65 | 56 | 58 | 78 | 75 | 83 | 44  | 84          | 68        | 78     |
| 1434       | General Geology       | BA or BS | 1003    | 73 | 59 | 67 | 75 | 78 | 50 | 67 | 67  | 83          | 67        | 77     |
| 1439       | Environmental Geology | BA or BS | 1003    | 55 | 59 | 44 | 75 | 44 | 50 | 42 | 44  | 64          | 52        | 64     |
| 1440       | Environmental Geology | BA or BS | 1003    | 77 | 71 | 78 | 58 | 72 | 75 | 75 | 56  | 89          | 72        | 81     |
| 1449       | Engineering Geology   | BA or BS | 1003    | 91 | 88 | 83 | 58 | 72 | 75 | 83 | 67  | 98          | 79        | 86     |
| 1450       | No Primary Area       | BA or BS | 1003    | 64 | 88 | 83 | 83 | 89 | 81 | 83 | 78  | 100         | 81        | 87     |
| 1452       | Economic Geology      | BA or BS | 1003    | 59 | 76 | 78 | 67 | 78 | 56 | 58 | 56  | 83          | 67        | 77     |

Tuesday, January 29, 2019      <sup>1</sup>see Content Domain Report for column labels      Page 1 of 8

Page: 14 of 1      1      No Filter      Ready      66%



# Using the FG as an Assessment Tool

## *University of West Georgia Model*

- ✓ Each graduating senior is required to take the FG examination as part of our capstone course
- ✓ Students pay for the cost of the exam as part of their lab/activity fees, but are reimbursed if they pass the exam
- ✓ Passing *scaled* score of 70%...determines national “minimum competency”
- ✓ Students are asked to share their exam statistics with the department, but are not required
- ✓ Department assesses the exam statistics to see if curriculum modifications are deemed necessary (i.e., 2014 modifications)
- ✓ If curriculum changes are made, the success or failure of these changes is assessed with results of future results of exam administrations





# University of West Georgia Model

## *University of West Georgia Assessment and Curriculum Changes:*

Based on analysis of FG CPAT data-

- ✓ **Economic Geology** was added to the Geology curriculum and required (January 2014)
- ✓ **Hydrogeology** is now a required course (January 2014)
- ✓ **Engineering Geology** is a highly suggested upper division elective
- ✓ **Mineralogy and Crystallography** will add an additional component to support Economic Geology
- ✓ **Plate Tectonics** became an elective
- ✓ **Geomorphology** is a suggested as an upper division elective
- ✓ **Field Geology and Geologic Mapping** will integrate site investigations into the course content.

All of these changes were made in January 2014...performance on the FG exam starting in 2015 showed an improvement in Economic Geology and Hydrogeology scores. An assessment success!



# Central Michigan University (CMU) Model

- CMU Model for *non-member States*
  - Allow use FG for academic assessment
  - Pay a per administration access fee, similar to other non-member states
  - Does not have the benefits of an ASBOG® member state
  - Will not be using the PG examination
  - Will not be issuing licenses
- CMU Model for *member States*
  - State Boards to allow university testing centers for proctoring of FG and PG examinations
  - Who better to proctor examinations than accredited testing centers
  - Allow for broader geographic distribution within a state
  - Many State testing centers are **not** equipped for CBT; university testing centers already have all the infrastructure needed; as ASBOG® transitions to CBT...seamless (?)
  - Testing, access and application fees...who gets the \$\$





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*Department of Geosciences*

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