# what employers want

PROFICIENCY in **critical thinking/problem solving** skills.

PROFICIENCY in **communicating** effectively to scientists and non-scientists.

MASTERY of **solving problems**, especially those requiring spatial and temporal (i.e. 3D and 4D) interpretations.

MASTERY of **making inferences** about the Earth system from observations of the natural world combined with experimentation and modeling.

MASTERY of **working with uncertainty**, non-uniqueness, incompleteness, ambiguity and indirect observations.

MASTERY of the **ability to access and integrate information** from different sources and to continue to learn.

PROFICIENCY in **understanding and using scientific research** methods.

PROFICIENCY in **quantitative skills** and the ability to **apply** them.

PROFICIENCY in **integrating data** from different disciplines and applying systems thinking.

PROFICIENCY in and MASTERY of strong **field skills** and a working knowledge of GIS.

PROFICIENCY in working in **interdisciplinary teams** and across cultures.

PROFICIENCY in **computational skills** and the ability to manage and analyze large datasets.

MASTERY of **technology** and versatility in its use (i.e. Google Earth, tablets, smartphones, apps).

# here's how we can help

IU GEOLOGIC FIELD STATION

# COURSES

lead to

*careers*

in GEOSCIENCES

INDIANA UNIVERSITY

JUDSON MEAD
GEOLOGIC FIELD STATION

# we teach the geological skills

**1.** HOW SYSTEMS WORK AND INTERACT
Evolution of the atmosphere through geologic time; Hydrosphere: ocean, ice, surface water, groundwater; Lithosphere: rock cycle, deformation, structure, tectonics; Pedosphere/surface: geomorphic, erosion, and surface processes, landscape evolution; Biosphere: paleontology, ecosystems (and paleoclimate); Natural resources, energy; Natural hazards

**2.** PROCESSES
Geo-mechanics/Stress State/Rheology; Geological Time/Earth Evolution; Plate Tectonics/Geodynamics; Tectonic Processes; Depositional Processes; Crystallization Processes; Geochemical Cycles – C, $H_2O$, N, P

**3.** TOOLS
Statistics/Uncertainty/Probability; Cartography; Geography and spatial thinking; Field Methods; Remote Sensing; Age Dating; Analytical/Numerical Modeling; Seismology/Geophysical sensing

**4.** NONLINEAR COMPLEX SYSTEMS
Size of systems – complexity of scale and interactions; Feedback loops, interactions, forcings; Implications and predictions

**5.** CONVENTIONAL CONCEPTS OF GEOLOGIC TIME
Paleontology, superposition; Relative vs absolute age; Tools to determine absolute age (radioisotopes, stable isotopes, etc.), precision of data, limitations

**6.** SURFACE PROCESSES
Stream/River flow, morphology, deposition, erosion, effect of floods; Transport relationships (all surface processes); Surface mechanical processes; Karst formation; Glacial till and overburden thickness

**7.** EARTH MATERIALS
How to measure, scale of measurement; Mechanical characteristics; Scales of heterogeneity; Processes and conditions of formation; Localizing mechanisims for deposits; Fluid dynamics, flow and fluid chemistry

**8.** EARTH STRUCTURE
Mechanical and compositional layers; Tools for defining Earth structure (seismic waves, analysis of earthquakes, etc.); Stress and strain; Rock mechanics and deformation processes; Fractures, faults, folds, other structural features, etc.; Basin formation; Episodic nature, planning perspectives, uncertainty; Structural controls on resource accumulations

# so you will have the professional skills

**2. 3. 5.** GEOSCIENCE THINKING
Temporal and spatial thinking; Systems thinking; Geologic reasoning and synthesis; Asking appropriate questions; Understand context of problems; Problem solving in 3-D and 4-D; Ability to work on problems with no clear answers; Managing uncertainty in problem solving; Working by analogy, inference and the limits of certainty; Intellectually flexible - applying skills in new scenarios

**1. 3. 4. 5.** TECHNICAL SKILLS
Data collection and interpretation, use of data and application; Evaluation of data, data quality, purpose of collecting data, understanding of how data will answer questions; Understanding data and uncertainties; Make predictions with limited data; Use of appropriate methods, reading and interpreting graphs; Probability and statistics (to understand risk); Understanding of scale; Encourage critical thinking; Experience with authentic research, collection of new information

**3. 6. 7. 8.** FIELD AND TECHNOLOGY SKILLS
Field camp and/or field mapping experiences; Improves spatial cognition, creative problem solving, teamwork, geoscience synthesis; Data-supported field skills are unique and essential, difficult to replicate or substitute; Technological diversity (need skills and training beyond point, click, and type) - i.e. not just black box

**1. - 8.** NON-TECHNICAL SKILLS
Science writing and verbal communication; knowing your audience; Listening skills; Goal setting; Managing problems on the front end; Solution-oriented approaches; Time management; Ethics, ethical awareness and conduct; Emotional literacy, learning styles, awareness of implicit bias

# for your career in

- Academia
- Construction firms
- Department of Natural Resources
- Environmental engineering
- Environmental consulting
- Environmental law
- Geoarchaeology
- Geochemistry/biogeochemistry labs
- Geology/Environmetal education
- Government intelligence agencies (NSA, CIA, military intelligence)
- State highway departments
- Hydrology/Water resources
- Military engineering
- Mining
- Museum curation
- Paleontology
- Park services and conservation
- Petroleum industries
- Science writing/journalism
- Space agencies (e.g., NASA)
- USGS and State geological surveys

# contact us

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