# GTCM: From Concept to Implementation

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## Roadmap

- Brief review of competency offerings
- Review of GTCM creation
- Introduction of model course outlines
- Production of GTCM-aligned content based on model course outlines

## What Geospatial Technology skills and competencies are needed by the geoscience workforce?

## How can curriculum be created to meet those needs?

## What existed to help?

Many past efforts to define skills & competencies of a "Geospatial Industry"

## GIS&T: Body of Knowledge

- Knowledge Areas (10)
  - Analytical Methods (AM)
  - Conceptual Foundations (CF)
  - Cartography and Visualization
  - Design Aspects (DA)
  - Data Modeling (DM)
  - Data Manipulation (DM)
  - Geocomputation (GC)
  - Geospatial Data (GD)
  - GIS & T and Society (GS)
  - Organizational and Institutional Aspects (OI)

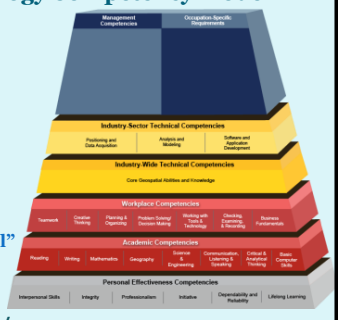
**1,660 Educational Objectives**

## Skill Areas

- Specific Geospatial
- Interpersonal
- Domain Knowledge
- Business & Computer

## U.S. Dept of Labor Geospatial Technology Competency Model

- Industry defined competencies
- Building Block Tiers:
  - Personal
  - Academic
  - Workplace
  - Industry Wide – this is a good source of competencies
  - Industry Sectors
- Each block "links to full" description



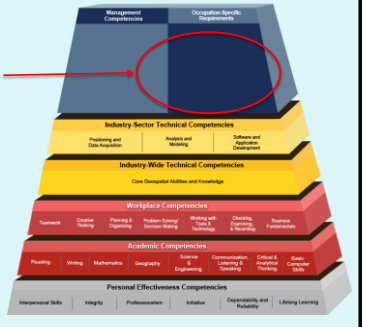

http://www.careeronestop.org

## Building Block Details – download as a PDF


## Tier 6 & 7

Occupation Specific Competencies

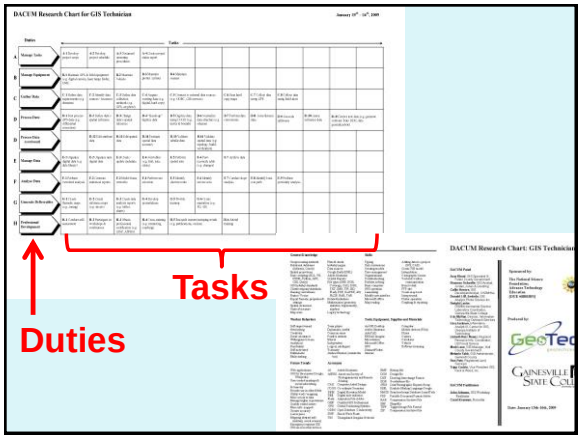
## Entry Level Geospatial workforce




## DACUM Job Analysis

- Panels of 8 to 10 expert workers and a facilitator over two - 8 hour days
- What do they do and what do they need to know

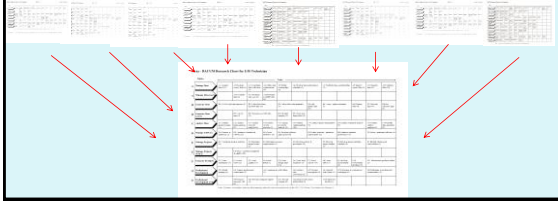
*DACUM: Developing A CurriculUM used regionally for competency based education & training by industry, government & education*




## Meta-DACUM Methodology

**By consolidating validated results from multiple DACUM analyses for a single job taken at various US locations, we can identify a comprehensive list of national competencies.**

*Geotech Center, 2009*



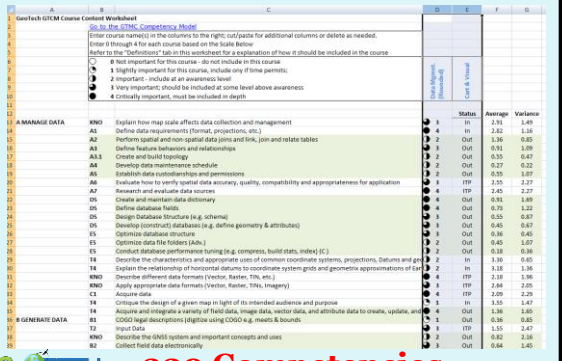
## Methodology – How to Go From Lists to Curriculum?

- GTCM structure:
  - 5 Tiers compiled by experts from Industry
  - approved by USA Dept of Labor in 2010
- MetaDACUM:
  - 320 plus skills & competencies from expert workers
  - Vetted by 475 GISP's across USA
- Create Program Content and Assessment Tools and Curriculum:
  - Expert Geospatial Educator Panels:
    - Take long "lists" of competencies in an Excel worksheet
    - Determined courses/descriptions and SLOs
    - Parse list of competencies by depth into model course outlines

## Model Courses Outlines

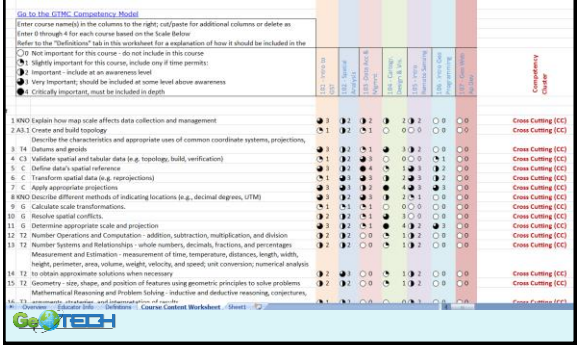
- Geo 100 – Awareness Stand alone Model Course
- "Model Courses & Certificate"
  - GST 101 – Introduction to Geospatial Technology
  - GST 102 – Spatial Analysis
  - GST 103 – Data Acquisition and Management
  - GST 104 – Cartographic Design and Visualization
  - GST 105 – Introduction to Remote Sensing
  - GST 106 – Introduction to Geospatial Programming
  - GST 107 – Geospatial Web Application and Development
  - GST 108 – Capstone
  - GST 109 – Internship

| Value | Level of inclusion in course | Bloom's Key Word Examples from 6 Levels* | Representative type of Presentation and/or Activity |
|---|---|---|---|
| 0 | | | do not include |
| 1 | Awareness | recognize, communicate | included as part of a lecture or demo |
| 2 | Comprehension | grasp meaning, interprets, comprehends | included as part of a lecture and as part of an activity |
| 3 | Application /Analysis | apply, calculate, demonstrate, employ, illustrate, interpret, relate, use | included as part of a major topic of a Module and applied in an activity |
| 4 | Synthesis Mastery | Compare, construct, contrast, design, develop, … | included in depth as major topic of a Module with a significant activity to apply the skill or competency independently |



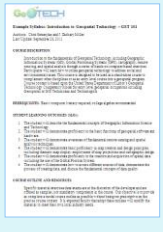
320 Competencies

## Competency Certificate Tool



## Model Course Outline and Pack Contents

- Example syllabus
  - Description & Student Learning Outcomes
  - Course Learning Units & other resources
- Course outline
  - Aligned with course syllabus teaching units/SLOs
  - Resource List
- Evaluation Rubrics
- Model Course Spreadsheet
- Curriculum for some courses



## Geotechcenter.org – GTCM Resources

http://moodle.delmar.edu

## Production of GTCM-Aligned Course Content

- DOL TAACCCT Grant providing funding
- Building out GST 101-110
- All released under Creative Commons Share-Alike 3.0

## Course Design Philosophy

- Create turn-key curriculum
- Modularize
- Provide raw materials
- Release under Creative Commons
  - Required by DOL TAACCCT Grant
- Be vendor agnostic in lectures
- No textbook required…but still recommended

## Let's consider GST 104

- Cartographic Design

## Content of Each Course

- Course:
  - Course Module
    - Lab
      - Virtual machine image / lab data
    - Lectures – broken into modular sections
      - Scripts
    - Quiz
  - Exams

## Format of Material

- Raw
  - Powerpoints/Word Documents
- Finished
  - ….still working on this part
    - Was considering storyline
    - Might end up with text on screen with interactive elements

## Let's take a tour!

## Thank You!

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