

## CC-1: Core Competency Checklist

Please indicate your competency in each of the below-listed by indicating how you gained the knowledge. You must reference at least one education and/or work experience for each of the 24 listed areas of technical competency to meet the threshold for certification.

Indicate the educational course included on Form EDU-2 (Course Points) or the work experience included on Form EXP-2 (Professional Profile), as applicable, in the appropriate column.

You may list both an education course and a work experience, if necessary, to indicate how you gain the required knowledge and skills for a single competency area. Any source-competency relationship that does not appear obvious should be explained on a separate sheet.

Competency Area	Education Course Title (from EDU-2)	Work Experience (from EXP-S)
<i>Example:</i> GD10 – Aerial imaging and photogrammetry		#3
<i>Example:</i> AM3 – Geometric measures	Geog12534: Human Geography	
<i>Example:</i> GD4 – Datums	GIS546: GIS Coordinate Systems	#1, 4, 5
AM3 – Geometric measures		
AM4 – Basic analytical operations		
AM5 – Basic analytical methods		
CF3 – Domains of geographic information		
CF4 – Elements of geographic information		
CV2 – Data considerations		
CV3 – Principles of map design		
CV6 – Map use and evaluation		
DA4 – Database design		
DM2 – Database management systems		
DM3 – Tessellation data models		
DM4 – Vector and object data models		
DN1 – Representation transformation		
DN2 – Generalization and aggregation		
GD1 – Earth geometry		
GD3 – Georeferencing systems		
GD4 – Datums		
GD5 – Map projections		
GD6 – Data quality		
GD10 – Aerial imaging and photogrammetry		
GD12 – Metadata, standards, and infrastructures		
GS6 – Ethical aspects		
OI5 – Institutional and inter-institutional aspects		
OI6 – Coordinating organizations		

Information regarding the topical content of each competency area is contained on the next two pages. Your level of competency must allow you to procedurally apply the related knowledge, skills, and abilities to solve routine problems. You do not need to be able to perform all of the tasks listed in the Body of Knowledge for each competency topic. Any statement of competency alleged by an applicant must conform to the GISCI Rules of Conduct.

## Competency Area Descriptions

The core competencies listed on Form CC-1 are taken from the *Geographic Information Science and Technology (GIS&T) Body of Knowledge – 2006* developed by the University Consortium for Geographic Information Science (UCGIS). The Body of Knowledge covers 10 knowledge areas, which include a total of 114 competency units. The 24 competency units identified in the Body of Knowledge as containing the core knowledge, skills, and abilities of a well-rounded GIS&T practitioner have been adopted by GISCI as the core competencies that establish a threshold qualification for GISP certification.

While the title of each competency unit is expressive of its general content, UCGIS felt it necessary and useful to explicitly define each unit in terms of the topics covered. These content descriptions are offered here as a guide to the applicant for identifying the specific knowledge required.

### AM3 – Geometric measures

- Distances and lengths
- Shape
- Proximity and distance decay
- Area
- Proximity and distance decay
- Adjacency and connectivity

### AM4 – Basic analytical operations

- Buffers
- Overlays
- Neighborhoods
- Map Algebra

### AM5 – Basic analytical methods

- Point pattern analysis
- Kernels and density estimation
- Spatial cluster analysis
- Spatial interaction
- Analyzing multidimensional attributes
- Cartographic modeling
- Multi-criteria evaluation
- Spatial process models

### CF3 – Domains of geographic information

- Space
- Relationships between space and time
- Time
- Properties

### CF4 – Elements of geographic information

- Discrete entities
- Fields in space and time
- Events and processes
- Integrated models

### CV2 – Data considerations

- Source materials for mapping
- Data abstraction: classification, selection, and generalization
- Projections as a map design issue

### CV3 – Principles of map design

- Map design fundamentals
- Typography for cartography & visualization
- Color for cartography and visualization
- Basic concepts of symbolization

### CV6 – Map use and evaluation

- The power of maps
- Map interpretation
- Evaluation and testing
- Map reading
- Map analysis
- Impact of uncertainty

### DA4 – Database design

- Modeling tools
- Logical models
- Conceptual models
- Physical models

### DM2 – Database management systems

- Co-evolution of DBMS and GIS
- Object-oriented DBMS
- Relational DBMS
- Extensions of the relational model

### DM3 – Tessellation data models

- Grid representations
- Grid compression methods
- The TIN model
- Hierarchical data models
- The raster model
- The hexagonal model
- Resolution

### DM4 – Vector and object data models

- Geometric primitives
- The spaghetti model

<ul style="list-style-type: none"> <li>• The topological model</li> <li>• The network model</li> <li>• Object-based spatial models</li> </ul>	<ul style="list-style-type: none"> <li>• Classic vector data models</li> <li>• Linear referencing</li> </ul>
<b>DN1 – Representation transformation</b>	
<ul style="list-style-type: none"> <li>• Impacts of transformations</li> <li>• Interpolation</li> <li>• Vector-to-raster and raster-to-vector conversions</li> </ul>	<ul style="list-style-type: none"> <li>• Data model and format conversion</li> <li>• Raster resampling</li> <li>• Coordinate transformations</li> </ul>
<b>DN2 – Generalization and aggregation</b>	
<ul style="list-style-type: none"> <li>• Scale and generalization</li> <li>• Classification and transformation of attribute measurement levels</li> </ul>	<ul style="list-style-type: none"> <li>• Point, line, and area generalizations</li> <li>• Aggregation of spatial entities</li> </ul>
<b>GD1 – Earth geometry</b>	
<ul style="list-style-type: none"> <li>• History of understanding Earth's shape</li> <li>• Spheres and ellipsoids</li> </ul>	<ul style="list-style-type: none"> <li>• Geoids</li> </ul>
<b>GD3 – Georeferencing systems</b>	
<ul style="list-style-type: none"> <li>• Geographic coordinate systems</li> <li>• Tessellated referencing systems</li> </ul>	<ul style="list-style-type: none"> <li>• Plane coordinate systems</li> <li>• Linear referencing systems</li> </ul>
<b>GD4 – Datums</b>	
<ul style="list-style-type: none"> <li>• Horizontal datums</li> </ul>	<ul style="list-style-type: none"> <li>• Vertical datums</li> </ul>
<b>GD5 – Map projections</b>	
<ul style="list-style-type: none"> <li>• Map projection properties</li> <li>• Map projection parameters</li> </ul>	<ul style="list-style-type: none"> <li>• Map projection classes</li> <li>• Georegistration</li> </ul>
<b>GD6 – Data quality</b>	
<ul style="list-style-type: none"> <li>• Geometric accuracy</li> <li>• Resolution</li> <li>• Primary and secondary sources</li> </ul>	<ul style="list-style-type: none"> <li>• Thematic accuracy</li> <li>• Precision</li> </ul>
<b>GD10 – Aerial imaging and photogrammetry</b>	
<ul style="list-style-type: none"> <li>• Nature of aerial image data</li> <li>• Aerial image interpretation</li> <li>• Vector data extraction</li> </ul>	<ul style="list-style-type: none"> <li>• Platforms and sensors</li> <li>• Stereoscopy and orthoimagery</li> <li>• Mission planning</li> </ul>
<b>GD12 – Metadata, standards, and infrastructures</b>	
<ul style="list-style-type: none"> <li>• Metadata</li> <li>• Data warehouses</li> <li>• Transport protocols</li> </ul>	<ul style="list-style-type: none"> <li>• Content standards</li> <li>• Exchange specifications</li> <li>• Spatial data infrastructures</li> </ul>
<b>GS6 – Ethical aspects</b>	
<ul style="list-style-type: none"> <li>• Ethics and geospatial information</li> </ul>	<ul style="list-style-type: none"> <li>• Codes of ethics for geospatial professionals</li> </ul>
<b>OI5 – Institutional and inter-institutional aspects</b>	
<ul style="list-style-type: none"> <li>• Spatial data infrastructures</li> <li>• Technology transfer</li> <li>• Openness</li> <li>• Implications of distributed GIS&amp;T</li> </ul>	<ul style="list-style-type: none"> <li>• Adoption of standards</li> <li>• Spatial data sharing among organizations</li> <li>• Balancing data access, security, and privacy</li> <li>• Inter-organizational and vendor GIS</li> </ul>
<b>OI6 – Coordinating organizations</b>	
<ul style="list-style-type: none"> <li>• Professional organizations</li> <li>• The geospatial community</li> <li>• Federal agencies and national and international organizations and programs</li> </ul>	<ul style="list-style-type: none"> <li>• Publications</li> <li>• The geospatial industry</li> <li>• State and regional coordinating bodies</li> </ul>