



GEOSPATIAL ENGINEERING COMPETENCIES

Geographic Information Science

The character and structure of spatial information, its methods of capture, organisation, classification, qualification, analysis, management, display and dissemination, as well as the infrastructure and technologies necessary for the optimal use of this information in an engineering context.

GEIS01		Competency	Spatial data				
			Date of assessment				
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
A	E E	B B	<ol style="list-style-type: none"> 1. Metadata 2. Application of standards 				
B	1 at E, rest at K	1 at B, rest at E	<ol style="list-style-type: none"> 1. Transformation / data manipulation 2. Vector-to-raster and raster-to-vector 3. Raster re-sampling 				

GEIS01: Spatial data

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

GEIS02		Competency	Data modelling				
			Date of assessment				
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
A	2 at E, 2 at K, rest at A	1 at B, 2 at E rest at K	<ol style="list-style-type: none"> 1. Vector Data Models 2. Vector Data Models 3. Geometric primitives 4. Spaghetti model 5. Topological model 6. Network model 7. Linear referencing 				
B	1 at E, rest at K	1 at B, rest at E	<ol style="list-style-type: none"> 1. Tessellation Data Models 2. Grid representation 3. Raster model 4. Triangulated Irregular Network (TIN) model 				

GEIS02: Data modelling

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

GEIS03		Competency	Spatial analysis and processing				
			Date of assessment				
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
A	1 at E, 1 at K, rest at A	2 at B, rest at E	1. Basic Analytical Operations 2. Buffers 3. Overlays 4. Neighbourhoods 5. Map algebra				
B	1 at E, rest at K	1 at B, rest at E	1. Analytical Methods 2. Surface analysis 3. Network analysis 4. Cartographic modeling				
C	2 at E, 2 at K rest at A	2 at B, rest at E	1. Spatial Queries and Measures 2. Distance & lengths 3. Shape 4. Area 5. Proximity 6. Adjacency 7. Connectivity 8. Intervisibility				

GEIS03 continued		Competency	Spatial analysis and processing					
			Date of assessment					
Optimum Standard		Activity Details		A	K	E	B	
ITEM	TECHNICAL MEMBER	MEMBER						
D	2 at E, rest at K	B B B B	1. Structured Query Language (SQL) and Attribute Queries 2. Aggregate data 3. Group by and order clauses 4. SQL Join 5. Geographic analysis					
E	E	B	Geostatistics					
F	K E	B K	1. Geocoding 2. Direct (X,Y) 3. Indirect (e.g. post code)					

GEIS03: Spatial analysis and processing

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

GEIS04		Competency	Visualisation				
			Date of assessment				
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
A	1 at E, 2 at K, rest at A	1 at B, 1 at E, rest at K	1. Map 2. Thematic 3. 3D drape 4. View shed 5. Fly through 6. Time series				

GEIS04: Visualisation

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

GEIS05		Competency	Software and initiatives	Date of assessment			
		Optimum Standard	Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
A	E	B	GIS Software Apply desktop and/or Web GIS software to meet core and GIS competencies				
B	All A	3 at K, rest at A	<ol style="list-style-type: none"> 1. Open Geospatial Consortium (OGC) software 2. Open Source Geospatial Foundation 3. Geospatial libraries 4. Desktop applications 5. Web mapping 6. Servers 				
C	All A	All K	<ol style="list-style-type: none"> 1. Geospatial Initiatives 2. Digital National Framework 3. Inspire 4. Making Public Data Public 				

GEIS05: Software and initiatives

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

GEIS06		Competency	Technologies – GIS software development				
			Date of assessment				
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
A	K	B	Software Development Concepts Understand and demonstrate the concepts behind GIS software development				
B	All A	1 at B, 1 at E, rest at K	1. Development Environment 2. Integrated Development Environment (IDE) 3. Menu Bar 4. Toolbar 5. Project explorer 6. Properties 7. Editing 8. Compiling 9. Linking modules into a projects 10. Debugging				
C	All A	1 at B, 1 at E, rest at K	1. Fundamentals / Conditions 2. Variables 3. Expressions 4. Looping, branching and flow-control 5. Procedures 6. Functions				

GEIS06 continued		Competency	Technologies – GIS software development				
			Date of assessment				
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
D	All A	1 at B, 1 at E, rest at K	1. User Interface/controls 2. Menus 3. Forms 4. Controls				
E	All A	1 at B, 1 at E, rest at K	1. Object Processing 2. Object Variables 3. Querying objects 4. Creating new objects 5. Modifying objects				
F	All A	1 at B, 1 at E, rest at K	1. Layer Processing 2. Reading from 3. Writing to 4. Creating 5. Modifying 6. Accessing remote databases				

GEIS06 continued		Competency	Technologies – GIS software development				
			Date of assessment				
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
G	All A	1 at B, 1 at E	1. File Processing 2. File input / output 3. File creation, copying and deletion				

GEIS06: Technologies – GIS software development

Name of Supervisor	Name of Applicant
Supervisor's signature	Date

GEIS07		Competency	Technologies – database development				
			Date of assessment				
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
A	All at A	1 at B, 1 at E, rest at K	1. Database Management Systems (DBMS) Concepts 2. Co-evolution of DBNS and GIS 3. Relational DBMS 4. Object-orientated DBMS 5. Spatial databases				
B	A	B	1. Database Development Concepts 2. Understand and demonstrate the concepts behind database development				
C	All at A	1 at B, 1 at E, rest at K	1. Tables 2. Fields 3. Indexing 4. Relationships				
D	All at A	1 at B, 1 at E, rest at K	1. User Interface / controls 2. Menus 3. Forms 4. Controls				

GEIS07 continued		Competency	Technologies – database development				
			Date of assessment				
	Optimum Standard		Activity Details	A	K	E	B
ITEM	TECHNICAL MEMBER	MEMBER					
E	All at A	1 at B, 1 at E, rest at K	1. Fundamentals/Conditions 2. Variables 3. Expressions 4. Looping, branching and flow-control 5. Procedures 6. Functions				
F	All at A	1 at B, 1 at E, rest at K	1. Object Processing 2. Object variables 3. Querying objects 4. Creating new objects 5. Modifying objects				

GEIS07: Technologies – database development

Name of Supervisor	Name of Applicant
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