1. OVERVIEW OF GISs
   - data, information and knowledge
   - geospatial information systems
   - principal system architectures
   - outline of database architectures
   - spatial processing requirements
   - current and future directions

2. GIS DESIGN METHODOLOGIES
   - GIS design and implementation
   - external system analysis
   - conceptual modeling and design
   - logical modeling and design
   - internal design and implementation
   - some practical considerations

3. LINE AND VECTOR ORIENTATION
   - primitive vector objects
   - polylines and polygons
   - planar graphs and digraphs
   - grids, meshes and contours
   - Delaunay triangulations
   - Voronoi tessellations

4. PIXEL AND PATCH ORIENTATION
   - overview of imaging procedures
   - general classification schemes
   - pixel and cell coding strategies
   - planar and spherical quadtrees
   - octrees and spatial extensions
   - quadtree and octree codings

5. OBJECT BASE AND ORIENTATION
   - objects and entities
   - entity relationship approach
   - hypergraph based approach
   - object orientation paradigm
   - object oriented design methods
   - practical considerations in GIS

6. RELATIONAL ALGEBRAS
   - relations and algebras
   - relational operators
   - common normalizations
   - examples of normal forms
   - examples of queries
   - optimization of queries

7. SPATIAL QUERIES / ALGORITHMS
   - nature of spatial queries
   - point-in-polygon queries
   - region and related queries
   - buffer zone related queries
   - path and corridor queries
   - three-dimensional extensions

8. BROWSING AND PROCESSING
   - browsing and preprocessing
   - example based procedures
   - information based strategies
   - optimal route determination
   - terrain modeling and rendering
   - examples of applications

9. INDEXING AND STANDARDS
   - general data indexing
   - geospatial data indexing
   - descriptions of metadata
   - Canadian metadata standards
   - international metadata standards
   - metadata dissemination tools

10. INTEGRITY AND UNCERTAINTY
    - basic integrity concepts
    - sample consistency questions
    - uncertainty and implications
    - statistical uncertainty modeling
    - fuzzy modeling of uncertainty
    - management of uncertainty

11. MULTI-RESOLUTIONS AND MEDIA
    - multiple resolutions
    - pyramidal data structures
    - multiscalar shape information
    - multispectral shape matching
    - shape from shading / texture
    - multimedia systems

12. WAREHOUSING, EXPERT SYSTEMS
    - overview of warehousing
    - architectural considerations
    - granularity considerations
    - information modeling / processing
    - knowledge representation / processing
    - examples of operational systems