TOPICS	KEY POINTS		LECTURE/LAB
Thematic Mapping	Data classification & symbolization Normalization	Quantile\equal interval\natural break, …number of categories, color schemes, symbology Compared to what? E.g., divide people by land area to map density; divide poor senior count by number of seniors for whom poverty status is known to map percent-poor	Lab 1; Lab 2; HW-1
	Exclusion	Filtering rows (do not include extraneous features: e.g., block groups with no people or households when mapping education level or median income) ; Filter (right-click layer and choose 'Filter' to specify which features (rows) should be included / excluded); Remember to annotate the excluded features in your legend.	Lab 1; Lab 2; HW-1
	Projection system	Key ideas/features regarding projected coordinate systems vs. lat\lon (geographic) coordinate reference system; how to convert projection system from one to another when saving a layer; how to assign a projection system to the X/Y values of a layer as saved on disk vs. setting the coordinate reference system for viewing in the map window.	Lec-2
GIS Models; **Querying (attribute table or feature);**	Vector vs. Raster; attribute tables	Vector: store X/Y/Z boundaries of objects in empty space (measured with a coordinate reference system) and link each features to attributes in table Raster: divide space into uniform grid cells (using a coordinate reference system) and store attributes describing contents of each grid cell (but attributes are not directly viewable in attribute table)	Lec-1, Lec-4, Lab-5 Lec-5, Lab-5
	Select by attribute	Querying a table to select features (rows) of interest. ('**Select features by value**' on main toolbar or '**Select features using an expression**' icon on toolbar of attribute table.)	Lab 2, Lab-3; HW 1 Part 1
	Select by location	Querying by location to select features of interest. If you have features selected, any of your subsequent operations can be applied only to the selected features.	Lab-2, HW-1

Data Manipulation	Field calculator	Add new fields or recalculate existing fields. Be careful when dividing a value using "Field Calculator", zero-value records should be excluded first (using 'filter' option or 'select by attribute')	Lab 2
	Virtual Layers	Use SELECT statements to create new tables in temporary virtual layers that can be saved (as SQLite tables) or joined to mapable layers	Lab-3
	Join table to a layer	Join attributes from a table Keep all records| Keep only matching records	Lab-2
	Aggregation	Right-click on column and choose 'Summarize' in ArcGIS to create new table with only one row per unique value in highlighted column; In QGUS, 'Layer / Create a Virtual Layer' to write SQL query (with 'group by' clause) to create table with one row per unique value of grouped fiel(s). Must resolve how to compute values for any non-grouped fields. (E.g., computing total area of each town at start of Lec-5) (Database manipulation in Ms-Access)	Lec-2. Lec-5
	Census Data	Census Geography; Summary Levels; Summary Files (SF1 & SF3)	Lec-3, Lab-3
Spatial Analysis: Vector Models	Buffer	Dissolve: to remove buffer feature overlap Not all cases need to dissolve the resulting buffers. In some cases, individual buffer for each feature would be more reasonable.	Lab-2, HW-1
	Union v.s. Intersect	Yields new geometry and retains identifiers to original layers; may have to adjust attributes and recalculate area, length, etc.	Lec-4, Lab-4, HW-2, Part 2
	Spatial join*	Creates a table join where fields from one layer's attribute table are appended to another layer's attribute table based on the relative locations of the features in the two layers.	Lec-4, Lab-4
	Raster analysis	Convert: features to raster; How to set up raster properties (cell size, mask area, extent)	Lec-5