

ASTR 5640: Themes to concentrate on for the final exam.

Some of the themes we've covered in the course are more central than others. The following list reviews the themes that you may wish to focus on in your review.

**Topic 11: Star Formation and Starburst Galaxies**

Physical mechanisms involved in star formation and their observational signatures.  
Quantitative methods for estimating the global star formation rates.  
Factors that influence the near-nuclear and disk star formation rates.  
Starburst galaxies: properties, evolution and demographics.

**Topic 12: Galaxy Interactions and Mergers**

Dynamical friction; tidal evaporation; tidal shocks.  
Major and minor mergers: how they unfold; roles of stars, dark matter, gas.  
Merger relics: evidence for past mergers.

**Topic 13: Galaxy Groups and Clusters**

Classification of galaxy clusters; differences between clusters.  
The galaxy density-morphology relation and mechanisms that can cause this.  
The hot intracluster gas – properties and origin  
Cluster masses: determination; relative amount of galaxies, gas, dark matter.

**Topic 15: Active Galactic Nuclei**

Overall structure of AGN – the various nested regions.  
Classification criteria: radio and emission line.  
Unification schemes, in particular the Seyfert 1 and 2 unification.  
Simple ionization relations; the radiation parameter.  
Simple accretion physics: various black hole properties; the Eddington limit.

**Topic 16: Cosmology**

Global properties; the velocity-distance relation; nature of redshift.  
Distance determination, and the measurement of  $H_0$   
The five cosmic components, their current  $\Omega$ s and  $w$ 's and density evolution.  
Non-Euclidean geometries; metrics; the Robertson-Walker metric.  
The Friedman and Acceleration equations of cosmology & solutions using  $E(z)$ .  
Newtonian re-construction using energy diagrams; vacuum's acceleration.  
Three distances: co-moving, emission, light-travel, and evaluation using  $E(z)$ .  
Three horizons: Hubble sphere, particle horizon, event horizon.  
Observables: Luminosity and Angular-Diameter distances, and their evaluation.