

GUÍA DOCENTE

Astrofísica Estelar

INDEX OF TOPICS AND SCHEDULE		
Topic	Title and contents	Weeks
1	Introduction and basic concepts Apparent luminosities and magnitudes. Stellar masses and radii. Mass-luminosity relation. Stellar temperatures. Spectral types. Hertzsprung – Russell diagrams. Stellar populations. The Sun: fundamental magnitudes. Equations of stellar structure. Virial Theorem.	1
2	Summary of stellar evolution Low-mass stars. Intermediate-mass stars. Massive stars. Supermassive stars.	2
3	Supernovae and stellar collapse Observational properties of supernova explosions. Relation between stellar collapse and hydrodynamic supernovae. Physics of the collapse. Bound phase. Post-bounce phase. Key aspects for the shock survival after the core bounce. Delayed mechanism. Convection and rotation as elements that help to explode a supernova.	1.5
4	Progenitors of gamma-ray bursts Introduction and general properties of gamma-ray bursts. Theoretical foundations. Progenitors.	1
5	Black holes Solutions of the Einstein equations of black hole type: Schwarzschild and Kerr. Dynamics of test particles around black holes. Spectrum of masses.	1.5
6	White dwarfs Equations of state. Structure and stability. Cooling. White dwarfs in binary systems: thermonuclear supernovae.	3
7	Neutron stars Equations of state. Structure and stability. Pulsars. Magnetospheres of neutron stars. Proto-neutron stars. Cooling. Neutron stars in binary systems.	3