

# HIGHER EDUCATION CERTIFICATE IN ASTRONOMY

## *Interstellar Astrophysics: SYLLABUS 2012*

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### **(1) OVERVIEW OF THE INTERSTELLAR MEDIUM**

- Evidence for the existence of the ISM
- Basic physical and chemical properties of the ISM
- Dust, interstellar extinction and reddening
- Types of clouds: H II regions, Dark clouds, Reflection nebulae
- Phases of the ISM: cold, warm and hot

### **(2) PHOTOIONIZED NEBULAE – H II REGIONS**

- Photoionization and recombination of hydrogen
- Heating and cooling processes in H II regions
  - Forbidden lines
  - Temperature and density diagnostics
- Sizes of H II regions: Strömgren spheres
- Heating and cooling of Diffuse Interstellar Clouds

### **(3) DIFFUSE CLOUDS**

- Heating and cooling mechanisms
- Absorption line formation
- Gas phase chemical abundances & depletion
- Dust, extinction & reddening
- Giant molecular clouds, molecules and radio/(sub-)mm emission

#### (4) STAR FORMATION

- How does it happen?
  - Hydrostatic equilibrium
  - Fragmentation and the Jeans' Mass
  - Pre-main sequence evolution
- Observational signatures of star formation
  - T Tauri stars, Proplyds, Protostar jets
- Classification of protostars
- Triggering mechanisms