### SARDAR PATEL UNIVERSITY
**Programme: B.Sc (Physics)**  
**Semester: VI**  
**Syllabus with effect from: November/December-2013**

<table>
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<tr>
<th>Paper Code: US06CPHY02</th>
<th>Total Credit: 3</th>
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<tbody>
<tr>
<td><strong>Title Of Paper:</strong> Atomic-Molecular Physics, Energy Science and Earth Science</td>
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<tr>
<th>Unit</th>
<th>Description in detail</th>
<th>Weighting (%)</th>
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</table>
| **I** | Atomic Physics  
| **II** | Molecular Physics  
Separation of Electronic and Nuclear Motion: The Born-Oppenheimer approximation, Types of molecular energy states and associated spectra, Types of spectra, Pure rotational spectra: Salient features of rotational spectra, The molecule as a rigid rotator: Explanation of rotational spectra, Diatomic molecule as a Non-rigid rotator, Validity of the theory: Determination of the inter-nuclear distance(Bond length) and moment of inertia, Isotope effect in rotational spectra, Rotational spectra of polyatomic molecules, Raman effect and its salient features, Observation of Raman spectra, Related Numericals |
| **III** | Energy Science  
Solar Thermal energy Conversion Systems: Solar Thermal energy Conversion Subsystems, Solar Thermal Collectors, Characteristics features of a collectors, Important aspects of solar thermal Collectors, Collector Efficiency, Simple Flat plate Collectors, Installation of Flat Plate Collectors, Guidelines for Installation, Shadow Effect, Cosine loss factor and reflective Loss Factor  
| **IV** | Earth Science  
Internal structure of Earth: The Core, Influence, chemical compositions, pressure and temperature in the earth, The Mantle, Influence, chemical compositions, pressure and temperature in the earth, The Crust, Influence, |
chemical compositions, pressure and temperature in the earth, The Atmosphere and Influence of the Atmosphere, Influence of the Sun and Moon, Density of the Earth, Mass of the Earth and the Sun

**Plate Tectonics:** Classification of plates, Oceanic and continental plates, Movement of plates, Plate boundaries

**Earthquakes:** Seismology, Seismograph, Determination of epicenter and the focus, Modern applications of Seismology, Relative numerical

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**Basic Text & Reference Books:**

- Molecular structure and Spectroscopy
  G Aruldhas, Prentice-Hall of India Private Limited
- Elements of Spectroscopy, S L Gupta, V Kumar, R C Sharma, Pragati Prakashan
- Energy Technology Nonconventional, Renewable and Conventional
  S Rao and Dr. B B Parulekar, Khanna Publishers
- Non Conventional energy Sources, G D Rai, Khanna Publishers Delhi
- Non-Conventional Energy systems, Principles, Progress and Prospects
  K M Mital, Wheeler Publishing – New Delhi
- Basics of Earth Science, D K Pandey, Anmol publisher, New Delhi
- Elements of properties of matter
  D S Mathur, S.Chand & company Ltd. New Delhi
- Seismology and Plate Tectonics
  Gubbins Devid, Cambridge Uni. Press