

**SARDAR PATEL UNIVERSITY**  
**Programme & Subject: M.Sc (Physics)**  
**Semester: IV**  
**Syllabus with Effect from: June - 2014**

<b>Paper Code: PS04EPHY03</b>	<b>Total Credit: 4</b>
<b>Title Of Paper: Signal Processing &amp; Satellite Communication</b>	

Unit	Description in detail	Weightage (%)
I	Nature of communication systems, Signals in time and frequency-domains, Need for modulation, Frequency-translation using non-linear impedance - Frequency multiplication, mixing and frequency suppression, Noise sources: external noise-atmospheric noise, extraterrestrial noise, industrial noise, internal noise-thermal agitation noise, shot noise, transit time noise, miscellaneous noise. Characterizing parameters- signal to noise ratio, noise figure. Analog modulation: Amplitude, Frequency and Phase modulations, Spectra, Power distribution and transmission bandwidths, Single Side Band amplitude modulation.	25%
II	Principles of generating and demodulating AM – Plate and Grid modulated Class C-Amplifier, SSB – The Filter, Phase Shift & The Third Methods, and FM signals – Direct Method, Varactor diode modulator. Tuned radio frequency and Superhetrodyne receiver, Choice of IF and image rejection, Automatic gain and frequency controls, Generation of composite video signals, Block diagram of BW TV transmitter and receiver. Idea about colour TV, Flat panel TV and LED TV.	25%
III	Pulse Amplitude Modulation and sampling theorem, Pulse Code Modulation, Effects of noise and companding, Data communication systems - transmission speeds and bandwidths, Synchronisation, modems. Digital modulation and demodulation: Frequency shift keying, Phase shift keying. Microwave repeaters, Geostationary satellites, Transponder and earth stations, Principles of multiple access systems- Frequency Division Multiplexing, Time Division Multiplexing. Optical fibers, Single and multimode, Advantages, Optical fiber communication link.	25%
IV	Wireless mobile communication, Transceiver, Cellular telephones-principle of operation, idea about cell structure, Principle and operation of International Mobile Equipment Identity(IMEI) number and its importance, Global System for Mobile communication(GSM)- Definition, frequency range, Advantages, limitations, Operation of Code Division Multiple Access (CDMA), advantages, limitations, comparison between GSM and CDMA , idea about Evolution Data Optimised (EVDO) - Principle and working, requirements.	25%

**Basic Text & Reference Books:-**

- Electronic Communication D. Roody and J. Coolen Prentice Hall.
- Electronic Communication Systems G. Kennedy, Mc-Graw Hill.
- Electronic Communication Systems F. R. Dungan, Delmar Publishers Inc.
- Microwave Principles H. J. Reich, J. G. Skalnik, P. F. Ordnung and H. L. Krauss, East-West Press
- Modern Microwave Technology V. F. Velley, Prentice Hall.
- Electronic Devices and Components J. Seymore, Longman Scientific and Technical Publication.

