VEER NARMAD SOUTH GUJARAT UNIVERSITY

Syllabus for B. Sc. Semester V

Subject: Physics

Paper – Electronics (Generic elective)

[2 credit course- 3 hours per week]

Unit – I **Amplifiers** **Duration: 15 hrs**

Single Stage Transistor Amplifiers:

Phase reversal (10.5), Load line analysis (10.8)

Multistage Transistor Amplifiers:

Introduction, Important terms (11.3), Properties of dB gain (11.4), RC Coupled Transistor Amplifier (11.5), Transformer –Coupled Amplifier (11.6), Direct-Coupled Amplifier (11.7)

Text Book: Principles of Electronics by V K Mehta & Rohit Mehta (S Chand Publication)

Unit – II **Differential Amplifiers** **Duration: 15 hrs**

Differential Amplifiers (17.1), DC Analysis of Differential Amplifier (17.2), AC analysis of Differential Amplifier (17.3), Input characteristics of an OP Amp (17.4), Common mode gain (17.5), The Current Mirror (17.7), The Loaded Differential Amplifier (17.8)

Text Book: Electronic Principles by Malvino

Unit – III **Modulation and Demodulation** **Duration: 15 hrs**

Radio broad casting, transmission and reception (16.1),Type of modulation (16.3), Amplitude Modulation (16.4), Modulation factor (16.5), Analysis of AM wave (16.6), Sideband Frequencies in AM wave (16.7), Power in AM wave (16.9), limitation of Amplitude Modulation (16.10)

Text Book: Principles of Electronics by V K Mehta & Rohit Mehta (S Chand Publication)

Note: illustrative problems on all the relevant topics should be covered.

REFRENCE BOOKS:

1. Basic electronics by B L Theraja, S Chand & Co.
2. Electronic Devices and circuits by A Mottershead, PHI Learning
3. Microelectronics by Millman & Grabel, McGraw Hill
4. Integrated electronics by Millman & Halkias, McGraw Hill
5. Electronic principles by J D Ryder, PHI Learning
6. Op Amp and Linear Integrated circuits by R A Gayakwad, PHI Learning
7. Principles of communication systems by Taub & Schilling, McGraw Hill
8. Electronic Communication by Roddy & Coolen, Pearson
9. Electronic Communication systems by G Kennedy, Tata McGraw Hill
10. Electronics devices and circuits by R Boylestad and L Nashelsky, PHI India pvt ltd.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

Syllabus for B. Sc. Semester VI

Subject: Physics

Paper – Electronics (Generic elective)

[2 credit course- 3 hours per week]

Unit – I **Operational Amplifier** **Duration: 15 hrs**

Operational Amplifier:

Introduction (13.1), Differential & Common mode operation (13.2), Op-Amp Basics (13.3), Practical Op-Amp circuits (13.4), Op- Amp specifications- DC offset parameters (13.5), Op-Amp specifications – Frequency parameters (13.6)

Op-Amp Applications:

Constant gain Multiplier (14.1), Voltage Summing (14.2), Voltage Buffer (14.3)

Text Books: Electronics devices and circuits by R Boylestad and L Nashelsky

Unit – II **Power Amplifier & Electronic Devices** **Duration: 15 hrs**

Introduction- definitions & Amplifier types (15.1), Transformer coupled Class-A Amplifier (15.3), Class-B Push Pull Amplifier (15.4), harmonic distortion (15.6)

PNPN Devices:

Tunnel diode (19.5), thermistor (19.11), Solar cell (19.10), Construction, working & Characteristics of UJT (20.13), Construction, working & Characteristics of SCR (20.2) to (20.5)

Text Book: Electronics devices and circuits by R Boylestad and L Nashelsky

Unit – III **Oscillators** **Duration: 15 hrs**

Feedback amplifiers:

Feedback connections (10.1), gain with feedback (10.2), the advantages of negative feedback (10.3), input impedance with feedback (10.4), output impedance with feedback (10.5), analysis of feedback amplifier (10.6)

Oscillators:

Classification of oscillators (12.1), Classification according to frequency range (12.1.2), principles of feedback oscillator (12.2), the phase-shift oscillator (12.3), transistor phase-shift oscillator (12.3.3), Wien-bridge oscillator (12.4), Colpitt's oscillator (12.5.4), Hartley oscillator (12.5.5)

Text Book: A text book of Electronics by S Chattopadhyay,
New central book agency, Kolkata

Note: illustrative problems on all the relevant topics should be covered.

REFRENCE BOOKS:

11. Basic electronics by B L Theraja, S Chand & Co.
12. Electronic Devices and circuits by A Mottershead, PHI Learning
13. Microelectronics by Millman & Grabel, McGraw Hill
14. Integrated electronics by Millman & Halkias, McGraw Hill
1. Electronic principles by J D Ryder, PHI Learning
2. Electronic Principles by Malvino, McGraw Hill

VEER NARMAD SOUTH GUJARAT UNIVERSITY

Syllabus for B. Sc. Semester V

Subject: Physics

Paper – Biophysics (Generic elective)

[2 credit course- 3 hours per week]

Unit – I **Biophysics** **Duration: 15 hrs**

Biomechanics:

Biostatics (1.1), biophysics of muscles (1.2), strength of bones (1.3), bio-dynamics (1.4), locomotion on land (1.5), locomotion in air (1.6), locomotion in water (1.7), role of gravity (1.8)

Biophysics and fluid flow:

Steady laminar flow (2.1), Poiseuille's formula (2.2), energetic of fluid flow (2.3), turbulence (2.4), hemodynamic (2.5), fluid flow in plants (2.6)

Unit – II **Biophysics** **Duration: 15 hrs**

Biophysics and gas transport:

The ideal gas (3.1), convective transport of gases (3.2), diffusion of gases Fick's law (3.3), physiology of respiration (3.4)

Physics of audition:

Transverse and longitudinal waves (4.1), physiological characteristics of sound (4.2), human ear (4.3), phase sensitivity and determination of direction (4.4), Doppler's effect (4.5)

Unit – III **Biophysics** **Duration: 15 hrs**

Physics of vision:

Wave nature of light (5.1), geometrical optics (5.2), refractive power (5.3), ratina and photoreceptors (5.4), photoreceptors and fiber optics (5.5), resolving power of eye (5.6), polarization and vision (5.7)

Text book: Elementary biophysics: An introduction by P K srivastava, Narosa publication

Note: illustrative problems on all the relevant topics should be covered.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

Syllabus for B. Sc. Semester VI

Subject: Physics

Paper – Biophysics (Generic elective)

[2 credit course- 3 hours per week]

Unit – I **Light microscopy** **Duration: 15 hrs**

Optical instruments (8.1), microscope (8.2), simple microscope (8.3), compound microscope (8.4), dark-film microscopy (8.5), optical microscope (8.6), phase contrast microscope (8.7), reflective microscope (8.8), interference microscope (8.9), fluorescence microscope (8.10), immuno-fluorescence microscopy (8.11), confocal scanning microscopy (8.12), centrifuge microscope (8.13), X-ray microscope (8.14), staining (8.16)

Unit – II **Electron microscopy** **Duration: 15 hrs**

Introduction (9.1), standard transmission microscope (TEM) (9.2), scanning electron microscope (SEM) (9.3), emission electron microscope (9.4), field emission microscopy (9.5), tunneling electron microscope (9.6), atomic force microscope (9.7), ion-probe analysis (9.8), micrometry, image analysis and video microscopy (9.9)

Unit – III **Spectroscopy** **Duration: 15 hrs**

Electromagnetic radiation (13.1), interaction of electromagnetic radiation with matter (13.2), infrared spectroscopy (13.3), Raman spectroscopy (13.4), ultraviolet and visible spectroscopy (13.5), photoluminescence spectroscopy (13.7)

Text book: Biophysics by G R Chatwal, Himalaya publishing house

Note: illustrative problems on all the relevant topics should be covered.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

Syllabus for B. Sc. Semester V

Subject: Physics

Paper – Engineering Physics (Generic elective)

[2 credit course- 3 hours per week]

Unit – I GRAVITATION Duration: 15 hrs

Newton's law of gravitation (6.1), gravitational field (6.2), gravitational potential (6.3), determination of "G" (6.4), escape velocity (6.12), Kepler's law of planetary motion (6.13), proof of Kepler's laws (6.14), satellites (6.15), the period of satellite (6.16), state of weightlessness (6.17), gravity (6.18), variation of acceleration due to gravity (6.19), simple pendulum (6.20), compound pendulum (6.21), points about which the time period of a compound pendulum is same (6.22), determination of "g" by bar pendulum (6.23), Kater's reversible pendulum (6.24), sources of error in the measurement of "g" (6.25)

Unit – II TRANSMISSION OF HEAT Duration: 15 hrs

Modes of transmission of heat (16.1), thermal conductivity (16.2), rectilinear flow of heat along a bar (16.3), determination of thermal conductivity (16.4), convection, properties of radiant heat (16.9), Prevost's theory of heat exchanges (16.10), emission and absorption of radiation (16.11), absorbing power (16.12), reflecting power (16.13), transmitting power (16.14), radiating or emissive power (emissivity) (16.15), black body (16.16), laws of black body radiations (16.17), Kirchhoff's law (16.18), Stefan's law or Stefan-Boltzmann's law (16.19), mathematical derivation of Stefan's law (16.20), determination of Stefan's constant (16.22), Newton's law of cooling (16.23)

Unit – III ACOUSTICS AND ULTRASONICS Duration: 15 hrs

Acoustics:

Basic requirements for the acoustically good halls (41.1), reverberation and time of reverberation (41.2), Sabine's formula for reverberation time (41.3), absorption coefficient and its measurement (41.4), transmission of sound and transmission

loss (41.5), factors affecting the architectural acoustics and their remedy (41.6), sound absorbing material (41.7)

Ultrasonics:

Ultrasonic waves (42.1), production of ultrasonic waves (42.2), detection of ultrasonic waves (42.3), properties of ultrasonics (42.4), wavelength of ultrasonic waves (42.5), applications of ultrasonic waves (42.6)

Text book: Engineering physics by Gaur and Gupta,
Dhanpat Rai publications pvt ltd. (8^{th} edition)

Note: Illustrative problems on all the relevant topics should be covered.

VEER NARMAD SOUTH GUJARAT UNIVERSITY

Syllabus for B. Sc. Semester VI

Subject: Physics

Paper – Engineering Physics (Generic elective)

[2 credit course- 3 hours per week]

Unit – I **OPTICS** **Duration: 15 hrs**

Cardinal points and eye-pieces:

Cardinal points of an optical system (21.1), construction of image using cardinal points (21.2), Newton's formula (21.3), deviation produced by an optical system (21.4), co-axial lens system: equivalent focal length and cardinal points (21.5), eye-pieces (21.6), Huygens' eye-pieces (21.7), cardinal points of Huygens' eye-pieces (21.8), Ramsden's eye-pieces (21.9), cardinal points of Ramsden's eye-pieces (21.10), comparison between Huygens' and Ramsden's eye-piece (21.11)

Optical instruments:

The magnifying glass or simple microscope (22.2), compound microscope (22.3), astronomical telescope (22.4), terrestrial telescope (22.5), Galileo's telescope (22.6), spectrometer (22.8)

Unit – II **THEROELECTRICITY** **Duration: 15 hrs**

Seebeck effect (51.1), variation of thermo-electric emf with temperature (51.2), thermo-electric series (51.3), measurement of thermo-electric emf (51.4), laws of intermediate metals or laws of successive contacts (51.5), laws of intermediate metals or laws of successive temperatures (51.6), the Peltier effect (51.7), Thomson effect (51.8), total emf in a thermo-couple (51.9), thermo-electric power (51.10), expression for Peltier and Thomson coefficients (51.11), thermo-electric power (51.12), applications of thermo-electric effect (51.13)

Unit – II **MODERN PHYSICS** **Duration: 15 hrs**

Atomic structure:

Atomic model (55.1), Thomson's plum pudding model (55.2), Rutherford's experiment on α –particle scattering (55.3), Rutherford's nuclear atomic model (55.4), Bohr's atomic model (55.5), Bohr's theory of hydrogen atom (55.6),

electron energy levels in hydrogen atom (55.7), spectral series of hydrogen atom (55.8), Bohr's quantum condition from de Broglie's hypothesis (55.10), short comings of Bohr's theory (55.11), types of spectra (55.24)

Classification of solids:

Energy levels in solids (60.1), valence band, conduction and forbidden band (60.2), conductors, semiconductors and insulators (60.3), chemical bonds in semiconductors like germanium and silicon (60.4), pure or intrinsic semiconductor and impurity or extrinsic semiconductor (60.5), impurity semiconductors (60.7), PN junction diode (60.8), junction transistors (60.9)

Text book: Engineering physics by Gaur and Gupta,
Dhanpat Rai publications pvt ltd. (8^{th} edition)

Note: Illustrative problems on all the relevant topics should be covered.