HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
B.Sc. Programme with 144 credits
CBCS-Semester-Grading Pattern
w.e.f. June-2011

General Pattern/Scheme of study components along with credits for Science faculty.

Part/Class	Course	Study Components	Instruction Hrs/ Week	Examination			Credit
				Internal	Uni. Exam	Total	
B. Sc. Sem –III		**Semester-III**					
		Core Compulsory (CC) Course					
	CC-I- 3	Core Course-I (Paper-3)	3	30	70	100	3
	CC-I- 4	Core Course-I (Paper-4)	3	30	70	100	3
	CC-II-3	Core Course-II (Paper-3)	3	30	70	100	3
	CC-II-4	Core Course-II (Paper-4)	3	30	70	100	3
		Practical Core (PC) Course					
	PC-I- 3	Practical Core Course-I (Paper-3)	3		50	50	1.5
	PC-I- 4	Practical Core Course-I (Paper-4)	3		50	50	1.5
	PC-II-3	Practical Core Course-II (Paper-3)	3		50	50	1.5
	PC-II-4	Practical Core Course-II (Paper-4)	3		50	50	1.5
		Foundation Course (FC)					
	FC-3	Foundation (**Generic**) Course – III Compulsory English (L.L.)	2	30	70	100	2
		Elective Course (E)					
	EG-3	Elective (**Generic**) Course –III	2		50	50	2
	ES-3	Elective (**Subject**) Course –III	2		50	50	2
			30	**150**	**650**	**800**	**24**
B. Sc. Sem-IV		**Semester-IV**					
		Core Compulsory (CC)Course					
	CC-I- 5	Core Course-I (Paper-5)	3	30	70	100	3
	CC-I- 6	Core Course-I (Paper-6)	3	30	70	100	3
	CC-II-5	Core Course-II (Paper-5)	3	30	70	100	3
	CC-II-6	Core Course-II (Paper-6)	3	30	70	100	3
		Practical Core (PC) Course					
	PC-I- 5	Practical Core Course-I (Paper-5)	3		50	50	1.5
	PC-I- 6	Practical Core Course-I (Paper-6)	3		50	50	1.5
	PC-II-5	Practical Core Course-II (Paper-5)	3		50	50	1.5
	PC-II-6	Practical Core Course-II (Paper-6)	3		50	50	1.5
		Foundation Course (FC)					
	FC-4	Foundation (**Generic**) Course – IV Compulsory English (L.L.)	2	30	70	100	2
		Elective Course (E)					
	EG-4	Elective (**Generic**) Course –IV	2		50	50	2
	ES-4	Elective (**Subject**) Course –IV	2		50	50	2
			30	**150**	**650**	**800**	**24**

Hemchandracharya North Gujarat University, Patan
B.Sc. Programme (CBCS-Semester-Grading pattern)
Semester end Examination
Format for Question paper Elective Courses (Subject) in Physics

There will be three questions. First question will be from Unit - I, Second question from Unit-II, and Third question will be from both the Units. All the questions are detailed as under .

Time: 2Hrs   **Total Marks: 50**

1 (a) Answer the following (Any two out of three)   08 Marks
       (Theory questions)

   (b) Attempt any two of following   (Out of three)   06 Marks
        (Theorytype **or** Application/Example/Problem)

   (c) Attempt any three (Out of five)   06 Marks
        (Short answer or objective type questions)

2 (a) Answer the following (Any two out of three)   08 Marks
       (Theory questions)

   (b) Attempt any two of following   (Out of three)   06 Marks
        (Theorytype **or** Application/Example/Problem)

   (c) Attempt any three (Out of five)   06 Marks
        (Short answer or objective type questions)

3   Answer the following (Any ten out of twelve)   10 Marks

      (M.C.Q. Type **or** objective type)

Hemchandracharya North Gujarat University, Patan
B.Sc. Programme (CBCS-Semester-Grading pattern)
Semester end Examination
Format for Question paper Core Compulsory Courses in Physics

There will be five questions each of 14 marks. First question will be from Unit - I, Second question from Unit-II, Third question from Unit-III, Forth question from Unit-IV and Fifth question will be from all four Units. All the questions are detailed as under .

Time: 3Hrs   **Total Marks: 70**

1 (a) Answer the following (Any one out of two **OR** two out of three)   08 Marks
  (Theory questions)

  (b) Attempt any three of following   (Out of five)   03 Marks
   (M.C.Q. Type)

  (c) Attempt any one (Out of two)   03 Marks

  (Application/Example/Problem)

2 (a) Answer the following (Any one out of two **OR** two out of three)   08 Marks
  (Theory questions)

  (b) Attempt any three of following   (Out of five)   03 Marks
   (M.C.Q. Type)

  (c) Attempt any one (Out of two)   03 Marks
   (Application/Example/Problem)

3 (a) Answer the following (Any one out of two **OR** two out of three)   08 Marks
  (Theory questions)

  (b) Attempt any three of following   (Out of five)   03 Marks
   (M.C.Q. Type)

  (c) Attempt any one (Out of two)   03 Marks
   (Application/Example/Problem)

4 (a) Answer the following (Any one out of two **OR** two out of three)   08 Marks
  (Theory questions)

  (b) Attempt any three of following   (Out of five)   03 Marks
   (M.C.Q. Type)

  (c) Attempt any one (Out of two)   03 Marks
   (Application/Example/Problem)

5 Answer the following (Any seven out of ten)   14 Marks

  (Short answer or objective type questions)

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
CBCS - Semester - Grading Pattern
B.Sc. Semester-III
PHYSICS SYLLABUS

<u>CC: PHY-301</u>

UNIT - I

Heat and Thermodynamics :

Characteristic functions, Enthalpy (11.1), The Helmol t'z and Gibb's function (11.2), Two Mathematical Theorems (11.3), Maxwell's equations (11.4), The T -ds equations (11.5), Energy equation (11.6), The Thermal Expansivity (11.9), Compressibility (11.10), Joule -Kelvin effect (Porous plug Experiment) (12.1), Liquef action of Gases by Joule -Kelvin effect (12.2).
Basic Reference   :
Heat and Thermodynamics   by Mark W. Zeemansky (5 th Edition)

Kinetic Theory of Gases:

Maxwell's Distribution Law of Velocities, Deduction of Maxwell – Boltzmann law , Determination of the values of constants 'a' and 'b' (6.5), Experimen tal Test of Maxwell's Law (6.6).

Basic Reference:
Thermodynamics and Statistical Physics by Singhal - Agarwal-Prakash Pragti Prakashan, Meerut.

Other References:
1. University Physics by Sears, Zee mansky and Young. (6 th Edition)
   Narosa Publication, New Delhi.
2. Heat Thermodynamics and Statistical Physics by Brijlal, Dr. Subrahmanyam, P.S.Hemne S.Chand.
3. Waves and Oscillations by N Subramanyam, Brijlal.

UNIT – II : Optics

Diffraction:

Fresnel's Diffraction: Introduction (17.1), Fresnel's Assumptions (17.3), Rectilinear Propagation of light (17.4), Zone Plate (17.5), Action of a zone plate for an incident spherical wave front (17.5.1), Difference between zone plate and a convex lens (17.5 .2), Distinction between Interference and diffraction (17.6), Fresnel and Fraunhoffer types of diffraction (17.7), Fraunhoffer diffraction at a double slit (18.4), Fraunhoffer diffraction at double slit (Calculus method),(18.4.1), Distinct between single s lit and double slit diffraction pattern (18.4.2), Fraunhoffer diffraction at N slit (18.6 & 18.6.1), Plane diffraction grating (18.7), Theory of plane transmission grating (18.7.1), Dispersive power of Grating (18.7.7)**.**

Basic Reference   :

A text book of OPTICS by Dr. N, Subrahmanyam, Brijlal, Dr, M,N, Avadhanulu   - S.Chand.

Other References:
1. A Text book of Light   by D.N.Vasudeva -   S. Chand & Co.
2. Fundamentals of Optics   by Jonkin's and White
3. Optics   by Ajoy Ghatak
4. Principles of Optics   by B.K. Mathur

UNIT - III: Solid State Physics

Crystal Structure:

Crystalline and Amorphous Solids (1.1), Crystal Lattice and Crystal Structure (1.2), Translational Symmetry, Space, Unit Cell and Primitive Cell (1.3), Symmetry Elements in Crystals (1.4 [1.4.1 to 1.4.6]), The Seven crystal Systems (1.5), Coordination Number (1.5.1), Some importance crystal structure (1.6), Simple Cubic Structure (1.6.1), Body Centered Cubic Structure (1.6.2), Face Centered Cubic Structure (1.6.3), Wigner-Seitz Cells (1.7), Miller Indices (1.8), The spacing of a set of crystal planes (1.11),Point Groups (1.12).

Basic reference:
Solid State Physics By Ajay Kumar Saxena (Macmillan India Limited)

Other reference:
1.Introduction to Solid State Physics By C.Kittle (John Willey)

2.Fundamental of Solid State Physics By Saxena, Gupta, Saxena (Pragati Prakashan)
3.Elements of Solid State Physics by J.P.Srivastava(PHI).

UNIT-IV

Atomic Spectra:

Franck-Hertz experiment (2.16), Critical potentials (2.17) Shortcomings of Bo hr's Theory (2.19), Summerfield extension of Bohr theory (2.20)
Basic reference:
Atomic and Molecular Physics By Raj Kumar (Campus Books)

(b) Historical Quantum Theory & Schrodinger equation:

Difficulties with Classical Mechanics (1.1),Bla ck Body Radiation (1.3), Shortcomings of the old Quantum theory (1.17)

A free particle in one dimension (2.1), Generalization to three dimensions (2.2), The operator correspondence and the Schrodinger equation for a particle subject to forces (2.3), Normalization and Probability Interpretation (2.4), Non -Normalizable Wave functions and Box Normalization (2.5).

Basic reference:
Quantum Mechanics by John L. Powell and Bernd Crasemann (for Arti.1.1,1.3,&1.17)
A Textbook of Quantum Mechanics By P.M.Mathews and K.Venkatesan (TMH)
(for Arti. 2.1,to 2.5)

Other reference:
1.Atomic Physics by Rajam (S. Chand New Delhi)

2.Quantum mechanics by Powell and Creaseman

3 Nuclear Physics by Kaplan

B.Sc. Semester-III
PHYSICS SYLLABUS

CC: PHY-302

UNIT-I : Electrostatics and Magnetostatics

Electrostatics in Dielectric:

Gaseous Non-Polar Dielectrics (2.11), Gaseous Polar Dielectrics (2.12), Non -Polar Liquids (2.13), Solid Dielectrics-Electrets (2.14).

Magnetostatics:

The Magnetic Potentials (4.9 – a & b), Magnetic Vector Potential due to Small Current Loop (4.12), An alternative method for finding the Vector Potential A and the Field B due to Current Loop (4.13), Magnetization (4.15), Magnetic Field Vector (4.16), Magnetic Susceptibility and Permeability (4.17), Boundary Conditions (4.18), Uniformly Magnetized Sphere in External Magnetic Field (4.19), A Comparison of Static Electric and Magnetic Fields (4.20).

Basic Reference :
Electromagnetics by B.B. Laud, New Age Int. Publisher (For Chapt. a & b)

Other Reference:
 1. Electricity and Magnetism   by Maharajan and Rangwala, THM
 2. Electricity and Magnetism Berkeley Physics course Vol. -II by EDWARD M PURCELL, McGraw Hill Pub.

UNIT-II : Electronics

Transistors Biasing and Stabilization:

Bias Stabilization (Operating point stabilization) (8.7, 8.7.1 & 8.7.2), Stability factor (8.8), Stabilization by Collector Base Resistance (8.9) Stabilization by potential divide r and Emitter resistor (8.10)

Basic Transistor Amplifier:

Transistor as a four pole (9.2), h-parameters with h-parameters equivivalent circuit (9.5 complete), Grounded Emitter Circuit - Mathematical analysis using h- parameters only (9.6), Comparative Study of three types of Amplifiers (9.9).

Solid state Devices:

JFET (12.1 to 12.6), UJT (26.6, 26.6.1 to 26.6.3). .

Basic Reference :
Hand book of Electronics by Gupta & Kumar 30 th Revised Edition,2002 Pragati Prakashan
Electronics andRadio Engineering by M.L. Gupta (9 th Edition-2002) D Raj & Sons.(For Ch-(C))

Other References:
1. Electronic Devices and Circuits   by A.Mottershead Prentice – Hall of India.
2. Integrated Electronics   by Millman & Halkias
3. Basic Electronics and Linear Circuits   by N.N.Bhargava, D.C.Kulshreshtha, S.C.Gupta.

UNIT-III   Mathematical Physics

Fourier series:

Introduction (7.1), Periodic functions (7.2), Application of Fourier series (7.3), Average values of a function (7.4), Fourier Co-efficient (7.5), Diriclet's conditions (7.6), Complex form of Fourier series (7.7), Other interval even and odd function (7.8), Perseval Theorem (7.11).

Co-ordinate Transformation:

Curvilinear Coordinates (10.6), Scale factors and basis vectors for orthogon al systems (10.7)

Basic References:

1. Mathematical method for physical sciences   by M. L. Boss John Wiley Publication.

Other Reference:

 Mathematical Physics   by B.D.Gupta

UNIT-IV

Special theory of Relativity:

Newtonian Relativity (14.1), Michelson-Morley experiment (14.2), Special theory of relativity (14.3), Lorentz Transformation (14.4), Consequences of Lorentz Transformation (14.5)-(a) Relativity of Simultaneity (b) the Lorentz-Fitz Gerald length Contraction (c) Time Dilation, Addition of Velocities (14.6), Mass-energy relation (14.8), Space time (14.9).

Basic Reference:
Introduction to Classical Mechanics   by Takwale & Puranik   Tata McGraw -Hill Publication (7th reprint-1986)

Other Reference:
1. Concept of Modern Physics   by Besier   McGraw–Hill
2. Elements of Special Relativity   by S.P.Singh & M.K.Bagde S. Chand & Co. New Delhi.
3. Properties of Matter   by Brijlal, N.Subrahmanyam, S.Chand.

B.Sc. Semester-III

PHYSICS SYLLABUS

PC: PHY-301

LABORATORY EXPERIMENTS

1. Coaxial Viscometer
2. To determine wave length of bright lines of mercury light using grating.
3. R.P. of Telescope
4. Searl's Goneometer. Determination of cardinal points and 'do'
5. Kundt's tube. Determination of 'y'
6. Diffraction by Adser `A' Patttetrn
7. e/k by Power Transistor

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B.Sc. Semester-III

PHYSICS SYLLABUS

PC: PHY-302

LABORATORY EXPERIMENTS

1. Absolute value of capacity using B.G. or S.G.

2. Low resistance by method of Projection

3. Comparison of capacity (C_1/C_2) by Desauty method

4. To determine self inductance by Anderson Bridge

5. Characteristics of a C.B. Transistor (PNP)

6. Characteristics of JFET & Determination of μ, r_d, g_m

7. Construction of AND, OR, NOT Gates using NAND & NOR Universal gates.

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B.Sc. Semester-IV
PHYSICS SYLLABUS

CC: PHY-401

UNIT-I: Solid State Physics
Atomic Cohesion and Crystal Binding:
      Cohesion of Atoms(2.1), Primary Bonds (2.2), The Covalent Bond (2.2.1), The Metallic Bond (2.2.2), The Ionic Bond (2.2.3), Mixed Bond (2.2.4), Secondary Bonds(2.3), The Vander wall's Bond (2.3.1), The Hydrogen Bond (2.3.2), The Cohesive Energy(2.4), Ionic Crystal (2.4.1), Noble Gas Crystal (2.4.2), Atomic Radi.Vs Lattice constants (2.5), Elastic con stants of crystals (2.6), Elastic Stress (2.6.1), Elastic strain(2.6.2), Dilation(2.6.3), Elastic Compliance and Stiffness constant (2.7), Elastic Energy density (2.7.1), Application to Cubic crystal (2.7.2), Bulk Modulus and compressibility (2.7.3).

Basic Reference   :
Elements of Solid State Physics. (2003) by J. P.Srivastava, PHI.

Other References
1. Introduction to Solid State Physics by C.Kittel,   Wiley Estarn. Delhi
2. Solid State Physics   by Saxena, Pragati Prakasion.
3. Solid State Physics by C. M. Kachhawa

UNIT-II :
Physical Interpretation and Condition on 'Ψ':
      Conservation of Probability (2.6), Expectation values, Ehrenfest's Theorem (2.7), Admissibility Condition on the Wave function (2.8)

Stationary States and Energy Spectra
      Stationary states : The time Independent Schrödinger Equation (2.9), A particle in a square well potential (2.10), Bound States in a square well ($E > 0$) (2.11), The square well: Non localized states ($E > 0$) (2.12).

Basic Reference:
A Text Book of Quantum Mechanics by Mathews and K.Venkatesan Tata Mc -Graw Hill Publication

Other References:
1. Quantum Mechanics   by John L. Powell and Bernd Crasemann
2. Quantum Mechanics   by Ghatak and Loknath
3. Quantum Mechanics   by Schiff

UNIT-III: Plasma Physics

The Basic concepts:

Introduction (1.1), Composition and Characteristics of a Plasma (1.2), Collisions (1.3), Elastic collisions (1.3.1), Inelastic collisions (1.3.2), Surface Phenomena (1.4), Transport Phenomena (1.5), Diffusion and Mobility (1.6), Vi scosity, Conductivity (1.7), Recombination (1.8), Ohm's law (1.9), Gas Discharge (1.10), Composition of various natural and Man -made Plasma (1.11), Plasma diagnostics (1.12), Plasma waves and Instabilities Confinement of Plasma (1.13), Space Plasma (1.14).

Motion of charge and velocity in Magnetic and Electric field:

Microscopic and macroscopic description (2.1), Maxwell's equation and Charge Conservation (2.2), Motion of charge particle in electric and magnetic fields (2.3), Uniform magnetic field and Oscillating electric field (2.4).

Basic Reference:
Elements of Plasma Physics   by S.N.Goswami New Central book Agency (P) Ltd., Calcutta.

Other References:
1. Introduction to Plasma Physics and Controlled Fusion Vol. -1 by F.F.Chen.
2. Plasma Physics   by S.N.Sen

UNIT-IV Optics

Resolving Power:

Resolving Power of Optical Instrument (19.5), Resolving Power of a telescope (19.7), Relation between magnifying power and resolving p ower of a telescope (19.7.1), Resolving Power of a Plane transmission grating (19.12).

Polarization:

Introduction (20.1), Polarization by double refraction (20.5.5), Double refraction (20.8.3), Huygens' explanation of double refraction (20.9 & 20.9.1), Types of polarized light, (20.15), Retarders or Wave plates(20.17), Quarter wave plate (20.17.1), Half wave plate(20.17.2),Production of Elliptically polarized light(20.18), Detection of Elliptically polarized light(20.18.1).

Basic Reference   :

A text book of OPTICS by Dr. N, Subrahmanyam, Brijlal, Dr, M,N, Avadhanulu - S.Chand.

Other References:
1. A Text book of Light   by D.N.Vasudeva -   S. Chand & Co.
2. Fundamentals of Optics   by Jonkin's and White
3. Optics   by Ajoy Ghatak
4. Principles of Optics   by B.K. Mathur

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B.Sc. Semester-IV
PHYSICS SYLLABUS

CC: PHY-402

UNIT-I

Electromagnetic Induction and its practical applications

Self Inductance and Mutual Inductance – Only Introduction (11.12, 11.16), Measurement of Self Inductance by Rayleigh's Method (11.15), Measurement of Mutual Inductance (11.23), Use of Earth Inductor – Measurement of Horizontal Component H of the Earth Magnetic Field (12.3-1), Measurement of Vertical Component V of the Earth Magnetic Field (12.3-2), Measurement of the Angle of Dip (12.3-3).

A.C. Bridges:

A.C. Bridges (17.5), Maxwell's Bridge (17.6.1), Owen Bridge (17.6.2), De Sauty's A.C. Bridge (17.7.1), Schering Bridge (17.7.3)

Basic reference:

Electricity and Magnetism By K.K.Tewari (S.Chand & Company Ltd.)

UNIT-II :   Electronics and Computer

Digital Electronics:

Introduction (21.1), Number systems used in Digital Electronics (21.2), Decimal, Binary, Hexadecimal and Octal (21.2.1 to 21.2.4), Binary Codes -(A) BCD, (B) Gray, (C) Excess-3 Codes (21.4), Arithmetic Circuits – Exclusive - OR Gate (21.9), Applications of X -OR Gate: (i) Binary to Gray Code Converter (ii) A Parity Checker (iii) The Half Adder (iv) The Full Adder (v) Parallel Adder (vi)Half subtractor, (vii)Full subtractor.

Basic Reference   :

Hand book of Electronics by Gupta & Kumar 30th Revised Edition, 2002   Pragati   Prakashan, Meerut.

Programming in – C:

Overview of C : History of C (1.1), Importance of C (1.2), Sample Program: Printing a Message (1.3), Basic Structure of C Programs (1.8), Programming Style (1.9), Executing a C Program (1.10).

Basic Reference   :

Programming in ANSI C by E.Balaguruswami (THM) (3rd Edition)

UNIT-III : Nuclear Physics

Radioactivity:

(Review of Radioactive decay laws, half life,mean life time etc.) Radioactive growth and decay (2.6) Ideal equilibrium (2.7) Transient equilibrium and secular equilibrium (2.8) Radioactive series (2.9)

The Q- Equation:
Introduction (3.1), Types of Nuclear Reactions (3.2), The Balance of Mass and Energy in Nuclear Reactions (3.3), The Q-Equation (3.4), Solution of the Q-Equation (3.5).

Basic reference:
Nuclear Physics by S.B.Patel (New age International (p) Ltd. Publishers)

Other References:
1. Elements of Nuclear Physics   by M.L.Pandya & R.P.S.Yadav Kedarnath Ramnath Meerut
2. Nuclear Physics   by Kaplan

UNIT-IV : Modern Physics
Orbital and Magnetic Dipole Moment (4.1), Larmor Precession (4.2), Space quantization (4.3), Electron spin (4.4), Vector model of atom (4.5), Spectroscopic terms and their notations (4.6), Stern Gerlach Experiment (4.7), Pauli's Exclusion Principle (4.8). Zeeman Effect - Normal Zeeman Effect and anomalous Zeeman Effect (12.1), Explanation of No rmal Zeeman Effect (12.2), Explanation of Anomalous Zeeman Effect (12.3) , Paschan back effect (12.4).

Basic Reference:
Atomic & Molecular spectra by Rajkumar Kedarnath Prakashan Meerut

Other Reference:
1. Spectroscopy Vol.-I   by Walker & Straw
2. Atomic Physics   by J.B.Rajam (5th Edition-1960) S. Chand & Co.
3. Physics of Atoms and Molecules by B.H.Bransden & C.J. Joachagh, Pearson Education.

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B.Sc. Semester-IV
PHYSICS SYLLABUS

<u>PC: PHY-401</u>

LABORATORY EXPERIMENTS

1. Resonance pendulum. Determination of 'lo' , 'r' & 'a'
2. Study of X-ray diffraction (Powder) Pattern.
3. Decay of Temperature when body is allowed to cool.(thermocouple)
4. To study elliptically polarized light using photocell and quarter wave plate.
5. To determine λ using Hartzmann formula
6. Activation energy of a semiconductor
7. Absorption co-efficient of liquid using photocell.

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B.Sc. Semester-IV
PHYSICS SYLLABUS

PC: PHY-402

LABORATORY EXPERIMENTS

1. Study of B.G. : To determine current sensitivity, volt sensitivity, figure of merit and Rg of B.G.
2. High resistance by equal deflection method.
3. Low resistance by Carry foster bridg.
4. To determine low value of 'C' using Schering bridge.
5. Characteristics of UJT & Determination of R_{BB}, V_D & η
6. Characteristics of a Photodiode
7. To verify Demorgan's Theorems using IC-7400.

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List of Elective (Subject) Courses For IIIrd and IVth Sem.
(in force from June 2011)
Credits-2

1. VACUUM PUMPS, PRESSURE GAUGES AND INSTRUMENTS

2. ASTRO/ SPACE PHYSICS

3. ENERGY TECHNOLOGY

DETAIL SYLLABUS

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
CBCS - Semester - Grading Pattern
B. Sc. :: PHYSICS :: SEMESTER-III & IV
ES PHY-04
(in force from June 2011)

VACUUM PUMPS, PRESSURE GUAGES AND INSTRUMENTS

UNIT-I

Vacuum Pumps, Pressure Gauges:

Exhaust Pumps and their characteristics (15.1), Rotary Oil Pumps (15.2), Molecular Pump(15.3), Diffusion Pump(15.4), Other methods of Producing Low Pressures(15.5), Pressure Gauges - McLeod Guage, Pirani Guage, Thermocouple Guage, Ionization Gauge,(15.7), Detection of a Leak in a Vacuum System (15.8).

Basic Reference : Mechanics by D.S.Mathur **S.**Chand.

UNIT-II

Optical Instruments:

Travelling Microscope, Cathetometer, Optical bench

Objective and Eyepiece, Kellner's Eyepiece, Huygens Eyepiece, Ramsden Eyepiece, Comparission of Ramsden Eyepiece and Huygens Eyepiece, Gauss Eyepiece, Telescopes, Refracting Astronomical Telescope, Reflecting Telescope, Newton's Telescope, Othe r reflecting Telescopes.

Electrical Instruments:

Moving coil Galvanometer, Ballistic Galvanometer, Calibration of Ballistic Galvanometer using different methods, Multimeters, Digital multimeter, Earp hone and Headphone.

Basic Reference   :

1. An Advanced Course in Practical Physics by D.Chattopadhyay, P.C. Rakshit, B.SAHA,

New Central Book Ltd.

2. A text book of OPTICS by Dr. N, Subrahmanyam, Brijlal, Dr, M,N, Avadhanulu

- S.Chand.(Ch-10.8 to 10.16)

3. Other Physics Practical Books

ASTRO/ SPACE PHYSICS

UNIT-I

Sun and Solar Radiation:
Introduction, Astronomical background, General description of the sun, Solar structure, Sun's outer layers, Composition, Visible features on the sun, More about sun's outer atmosphere, Temperature of the corona, Solar activity and Sunspot cycles.

UNIT-II

Cosmic rays and High energy astrophysics

An introduction to cosmic rays and high energy astrophysics: primary cosmic radiation, energy spectrum of primary cosmic rays, secondary cosmic rays, effect of geomagnetic field on cosmic rays, time variation of cosmic rays, photons in primary cosmic rays, origin of cosmic rays, basic facts about cosmic rays, region of confinement

Basic Reference:
An Introductory Course on Space Science and Earth's Environment
by   S.S.Degaonker (Gujarat University Publication, Ahmedabad)

ENERGY TECHNOLOGY

UNIT - I:

Introduction:

What is energy! , Energy Science and Technology, Energy, mass and environment, Some well known forms of energy, Energy Resources and forms of energy, Energy demand, Energy Routes for Conventional energy resources, National energy strategies, and energy plan, Energy management, Cost comparission of energy resources a nd conversion, Energy Conservation opportunities.

Environmental aspects of energy:

Introduction, Polution from use of energy, Conbustation Products of Fossil Fuels, Particulate Matter, Electrostatic Precipitator(ESP), Fabric Filter and Baghhouse.

UNIT-II

Geothermal Energy:

Introduction, Applications, Utilization of Geothermal Energy, Geothermal Energy Resources, Hydro Geothermal Resources, Hot Dry Rock Geothermal Resources. Merits and demerits of Petro-Geothermalenergy Power Plant, Geothermal Electrical Power Plants, Classification and types of Geotermal Power plants,

Wind Energy:

Introduction, Applications of Wind Energy and Historical Background, Merits and limitations of Wind energy Conversion, Nature and Origion of Wind, Wind Energy Quantom, Variables in Wind Energy Conversion systems, Wind power density, Power in wind Stream, Wind turbine Efficiency. Types of wind Turbine-Generator Units, Characteristics of wind turbine generator, Mono-blade HAWT, Twin-blade HAWT

References:

(1) Energy Technology by S.Rao and Dr. B.B. Parulekar, Khanna Pub.-1995 1st edition

(2) Solar Energy conversion, An introductory course By A. E. Dikon and J. D. Loslie

(3) Principles of Energy Conversion By Archie W. Cupl Jr.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN
CBCS - Semester - Grading Pattern
List of Elective (Generic) Courses
(in force from June 2011)
Credits-2

Elective (Generic) Course	
Semester-I	
Computer Skill-1	National Ethics
Human Society and Ethics	Indian Culture and Heritage
Society an Technology	Stress management
Indian Constitution	
Semester-II	
Environment science	Disaster management
Semester-III	
Computer Skill-II	Cultural heritage of Gujarat
Value Oriented education	Human resource development
Personality Development	
Semester-IV	
Basic computer applications	Presentation skills
Social ethics	Indian knowledge system
First aid and emergency care	
Semester-V	
Gandhi and phyloshopy	Library - a learning resource center
Indian religions	Handling of household equipments
Indian history	E-marketing (Telemarketing)
Indian geography	
Semester-VI	
Fundamental rights and duties	Hospitality
Vedic sciences	International relations
Indian Tribal Culture	