Re-Accredited by NAAC with 'A' Grade
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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–: પરિપત્ર :–

વિજ્ઞાન વિદ્યાશાખા હેઠળની ભૌતિકશાસ્ત્ર વિષય ચલાવતી સંલગ્ન સ્નાતક કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૧૯–૨૦ થી અમલમાં આવનાર F.Y.B.Sc.Physics Sem-I & II નાં અભ્યાસક્રમ અંગે ભૌતિકશાસ્ત્ર વિષયની અભ્યાસસમિતિની તા.૩૦/૦૪/૨૦૧૯ની સભાનાં ઠરાવ ક્રમાંક: ૨ અન્વયે કરેલ નીચેની ભલામણ વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૫/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક : ૩૨ અન્વયે સ્વીકારી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલએ તેની તા.૦૭/૬/૨૦૧૯ની સભાના ઠરાવ ક્રમાંક: ૫૯ અન્વયે સ્વીકારી મંજૂર કરેલ છે. તેની જાણ સંબંધકર્તા શિક્ષકો અને વિદ્યાર્થીઓને કરવી, તદ્ઉપરાંત તેનો અમલ કરવો.

ભૌતિકશાસ્ત્ર વિષયની અભ્યાસસમિતિની તા.૩૦/૦૪/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક: ૨

:: આથી ઠરાવવામાં આવે છે કે, પેટાસમિતિએ તૈયાર કરેલ F.Y.B.Sc.Physics Sem-I &II નો શૈક્ષણિક વર્ષ ૨૦૧૯–૨૦ થી અમલમાં આવનાર અભ્યાસક્રમ સર્વાનુમતે મંજુર કરી તે મંજૂર કરવા વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૫/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક : ૩૨

:: આથી ઠરાવવામાં આવે છે કે, પેટાસમિતિએ તૈયાર કરેલ F.Y.B.Sc.Physics Sem-I &II નો શૈક્ષણિક વર્ષ ૨૦૧૯–૨૦ થી અમલમાં આવનાર અભ્યાસક્રમ સ્વીકારી તે મંજૂર કરવા એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૦૭/૦૬/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંક: ૫૯

:: આથી ઠરાવવામાં આવે છે કે, વિજ્ઞાન વિદ્યાશાખાએ તેની તા. ૦૨/૦૫/૨૦૧૯ ની સભાના ઠરાવ ક્રમાંક : ૩૨ અન્વયે ભલામણ કરેલ શૈક્ષણિક વર્ષ ૨૦૧૯–૨૦ થી અમલમાં આવનાર F.Y.B.Sc.Physics Sem-I &II નો અભ્યાસક્રમ સ્વીકારી મંજૂર કરવામાં આવે છે.

બિડાણ: ઉપર મુજબ

ક્રમાંક : એકે./પરિપત્ર/૧૦૨૯૫/૧૯
તા. ૨૦–૦૬–૨૦૧૯

ઈ.ચા. કુલસચિવ

પ્રતિ,

૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની ભૌતિકશાસ્ત્ર વિષય ચલાવતી સંલગ્ન સ્નાતક કોલેજોના આચાર્યશ્રીઓ.
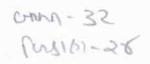૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

......તરફ જાણ તેમજ અમલ સારૂ.

Structure for B.Sc. Syllabus
Inforce from June 2019

B. Sc. (PHYSICS)

ઉત્તર - 32
Puslo1-28

એકેડેમિક કાઉન્સિલ તા.   -૨૦
બાબત.....................વિદ્યાપરિષદ.................

Sr. No.	Course Code	Course Title	Credits
1	PH-101	Physics Paper I	2
2	PH-102	Physics Paper II	2
3	PH-103	Practical	2

Faculty Code: **Science**   Subject Code: **PH**

Name of Program: **B.Sc.**   Subject: **PHYSICS**

External Examination Time Duration: **02 Hours**

Name of Exam	Semester	PAPER No.	Course Group	Credit	Internal Marks	External Marks	Total Marks
B.Sc.	1	PH-101		02	20	50	70
		PH-102		02	20	50	70
		PH-103	Practical	02	20	40	60

Veer Narmad South Gujarat University, Surat

Syllabus for F. Y. B. Sc. Sem I

Physics Paper I (PH – 101)

Unit 1	Vector analysis (Vector analysis by Murray Spiegel Schaum's Outline 2nd Ed. McGraw-Hill, 2009)
	Dot or scalar product, Cross or vector product, Triple product, reciprocal sets of vectors (Ch. 2), Ordinary derivatives of vectors, space curves, continuity and differentiability, differentiation formulae, Partial derivatives of vectors, differentials of vectors, differential geometry (Ch. 3), The vector differential operator del., the gradient, the divergence and the curl, formulae involving del, invariance(Ch. 4) Ordinary integrals of vectors, line integrals, surface integrals and volume integrals (Ch. 5), The divergence theorem of gauss, Stokes' theorem, Green's theorem in the plane, related integral theorems, integral operator form for del (Ch. 6) (Theorem statements only)
Unit 2	Force and Newton's laws and Force and Newton's laws (Physics by Halliday, Resnick and Krane, Vol. 1, 5th Ed. Wiley)
	Classical Mechanics (3.1), Newton's first law (3.2), Force (3.3), Mass (3.4), Newton's second law (3.5), Newton's third law (3.6), Weight and mass (3.7), Applications of Newton's laws in one dimension (3.8), Motion in three dimensions with constant acceleration (4.1), Newton's laws in three dimensional vector form (4.2) Projectile motion (4.3), Drag forces and the motion of projectile (4.4), Uniform circular motion (4.5), Relative motion (4.6)
Unit 3	Momentum and System of particles(Physics by Halliday, Resnick and Krane, Vol. 1, 5th Ed. Wiley)
	Collisions (6.1), Linear momentum (6.2), Impulse and momentum (6.3), conservation of momentum (6.4), two boy collisions (6.5), Two particle systems (7.2), many particle systems (7.3), centre of mass of solid objects (7.4), conservation of momentum in a system of particles (7.5), system of variable mass (7.6), rotational motion (8.1), The rotational variables (8.2), Rotational quantities as vectors (8.3), rotation with constant angular acceleration (8.4), relationships between linear and angular variables (8.6)
Unit 4	Elasticity (Properties of Matter by D. S. Mathur, S Chand & Co., 2009)
	Introduction (8.1), Load, stress and strain (8.2), Hooke's law (8.3), ductility, brittleness and plasticity (8.4), elastic behaviour of solids in general (8.5), factors affecting elasticity (8.7), three types of elasticity (8.8), equivalence of a shear to a compression and an extension at right angles to each other (8.9), deformation of a cube – bulk

| | modulus (8.12), modulus of rigidity (8.13), Young's modulus (8.14), relations connecting the elastic constant (8.15), Poisson's ratio (8.16), relations for K and n in terms of Poisson's ratio (8.17), limiting values of σ (8.18) |

Suggested Books:

1. Mathematical Methods for Physics and Engineering by Riley, Hobson and Bence, Cambridge University Press, 1998.
2. Mechanics (Berkley Physics Course 1 by C Kittle, W D Knight, M Alvine and A Ruderman, Tata McGraw-Hill, 1991.
3. University Physics by Young and R. Freedman, Pearson 13th Ed., 2013.

Syllabus for F. Y. B. Sc. Sem I

Physics Paper II (PH – 102)

Unit 1	Electrostatics I (Physics by Halliday, Resnick and Krane, Vol. 2, 5th Ed. Wiley)
	Coulomb's law (25.4), what is a field? (26.1), the electric field (26.2),), electric field of point charges (26.3),), electric field of continuous charge distributions (26.4), electric field lines (26.5), a point charge in an electric field (26.6) What is Gauss' law all about? (27.1), the flux of a vector field (27.2), the flux of the electric field (27.3), Gauss' law (27.4), applications of Gauss' law (27.5), Gauss' law and conductors (27.6), experimental tests of Gauss' law and Coulomb's law (27.7)
Unit 2	Electrostatics II (Physics by Halliday, Resnick and Krane, Vol. 2, 5th Ed. Wiley)
	Potential energy (28.1), electric potential energy (28.2), electric potential (28.3), calculating the potential from the field (28.4), potential due to point charges (28.5), electric potential of continuous charge distributions (28.6), calculating the field from the potential (28.7), equi-potential surfaces (28.8), Electric current (31.1), electromotive force (31.2), analysis of circuits (31.3), RC circuits (31.7)
Unit 3	Diode circuits (Electronic principles by A. P. Malvino, 6th Ed. Tata McGraw-Hill)
	The half-wave rectifier (4.1), the transformer (4.2), the full-wave rectifier (4.3), the bridge rectifier (4.4), the choke input filter (4.5), the capacitor input filter (4.6), peak inverse voltage and surge current (4.7), clippers and limiters (4.10), clampers (4.11)
Unit 4	Optics (Optics by AjoyGhatak, 6th Ed. McGraw-Hill Education)
	Introduction (3.1), laws of reflection and refraction from Fermat's principle (3.2), introduction (4.1), refraction at a single spherical surface (4.2), reflection by a single spherical surface (4.3), the thin lens (4.4), the principle foci and the focal length of a lens (4.5), the Newton's formula (4.6), lateral magnification (4.7),aplanatic points of a sphere (4.8), The matrix method (5.2), Unit planes (5.3), Nodal planes (5.4), A system of two thin lenses (5.5)

Suggested Books:

1. Elements of Electromagnetics by M N O Sadiku, Oxford University Press, 2001
2. Electricity and Magnetism by A S Mahajan and A R Rangwala 7th Ed. Tata McGraw-Hill, 2003.
3. University Physics by H. D. Young, R. A. Freedman and A. Lewis Ford, 13th Ed. Pearson Education, 2013
4. Fundamentals of Optics by F. Jenkins and H. White, 4th Ed. McGraw Hill Education, 2017

Syllabus for F. Y. B. Sc. Sem I

Practical (PH – 103)

List of experiments

	Group A
1	Error analysis and least square fit
2	To verify the parallel axes theorem of moment of inertia
3	To verify the perpendicular axes theorem of moment of inertia
4	Modulus of rigidity of a wire using torsional pendulum
5	Modulus of rigidity of a rod by Searle's apparatus
6	Poisson's ratio of rubber

	Group B
1	Low resistance by Wheatstone's bridge method of projection
2	Study of decay of current in RC circuit
3	Study of rectifiers (Half wave and full wave rectifier)
4	Resistivity of the material of a conductor using Ohm's law
5	Cardinal points of a lens system placed in air
6	To determine angle of prism using spectrometer

Suggested Books

1. D.C.Tayal ,University Practical physics,Edited by Ila Agarwal ,Himalayan Publishing House
2. B. L. Worsnop and H. T. Flint, Advanced Practical Physics, Asia Publishing House, New Delhi.
3. P. Khandelwal, A Laboratory Manual of Physics for Undergraduate Classes, Vani Publication House, New Delhi.
4. Geeta Sanon, BSc Practical Physics, 1st Edn. (2007), R. Chand & Co.

Note:

1. The duration of each experiment is of 2 hours. Two such experiments are to be performed by each student per week.
2. In the external exam, a student will have to perform two experiments, one from each group. The experiment will be of 2 hours duration.
3. It is recommended that There should not be more than 20 students per batch in the external exam.

Structure for B.Sc. Syllabus

Inforce from June 2019

B. Sc. (PHYSICS)

Sr. No.	Course Code	Course Title	Credits
1	PH-201	Physics Paper I	2
2	PH-202	Physics Paper II	2
3	PH-203	Practical	2

Faculty Code: **Science**   Subject Code: **PH**

Name of Program: **B.Sc.**   Subject: **PHYSICS**

External Examination Time Duration: **02 Hours**

Name of Exam	Semester	PAPER No.	Course Group	Credit	Internal Marks	External Marks	Total Marks
B.Sc.	1	PH-101		02	20	50	70
		PH-102		02	20	50	70
		PH-103	Practical	02	20	40	60

Syllabus for F. Y. B. Sc. Sem II

Physics Paper I (PH – 201)

Unit 1	Angular momentum and Gravitation (Physics by Halliday, Resnick and Krane, Vol. 1, 5th Ed.)
	Torques (9.1), rotational inertia and Newton's second law (9.2), rotational inertia of solid bodies (9.3), torque due to gravity (9.4), equilibrium applications of Newton's laws for rotation (9.5)
	Angular momentum of a particle (10.1), systems of particles (10.2), angular momentum and angular velocity (10.3), conservation of angular momentum (10.4), the spinning top (10.5), Origin of the law of gravitation (14.1), Newton's law of universal gravitation (14.2), the gravitational constant G (14.3), gravitation near the earth's surface (14.4), the two shell theorems (14.5), gravitational potential energy (14.6), the gravitational field (14.7), modern developments in gravitation (14.8)
Unit 2	Oscillation and Waves (Oscillation and Waves by Suresh Garg, C. K. Ghosh and Sanjay Gupta)
	Introduction (3.1), principle of superposition and linearity (3.2), superposition of two collinear SHOs of same frequency (3.3), superposition of two collinear SHOs of nearly equal frequencies (3.4), superposition of two mutually perpendicular harmonic oscillations (3.6), describing wave motion (7.3), phase of a wave (7.4), energy transported by a progressive wave (7.5), intensity of a wave (7.6)
Unit 3	Particle properties of waves (Concepts of Modern Physics by A. Beiser)
	Blackbody radiation (2.2), photoelectric effect (2.3), what is light (2.4), X-rays (2.5), X-ray diffraction (2.6), Compton effect (2.7), pair production (2.8), photons and gravity (2.9)
Unit 4	Elasticity (Properties of Matter by D.S. Mathur, S Chand & Co., 2009)
	Twisting couple on a cylinder (8.22), tensional pendulum (8.26), determination of coefficient of rigidity (n) for a wire (8.27), bending of a beam (8.39), the cantilever (8.30), transverse vibrations of a loaded cantilever (8.32), depression of a beam supported at the ends (8.33), determination of Y by bending of beams (8.34), determination of elastic constants by Searle's method (8.36)

Suggested Books:

1. Mechanics (Berkley Physics Course 1 by C Kittle, W D Knight, M Alvine and A Ruderman, Tata McGraw-Hill, 1991.
2. Modern Physics by Kenneth S Krane Wiley India Edition, 2016
3. Vibrations and Waves by A. P. French, CBS; 1st Ed., 2003

Syllabus for F. Y. B. Sc. Sem II

Physics Paper II (PH – 202)

Unit 1	**Magneto-statics and electromagnetic induction (Physics by Halliday, Resnick and Krane, Vol. 2, 5th Ed.)**
	Magnetic interactions and magnetic poles (32.1), the magnetic force on a moving charge (32.2), circulating charges (32.3), the magnetic force on a current carrying wires (32.5), the torque on a current loop (32.6), Faraday's experiments (34.1), Faraday's law of induction (34.2), Lenz's law (34.3), motional emf (34.4), generator and motor (34.5)
Unit 2	**Thermodynamics (Physics by Halliday, Resnick and Krane, Vol. 2, 5th Ed.)**
	Temperature and thermal equilibrium (21.1), thermal expansion (21.4), the ideal gas (21.5), a molecular view of pressure (22.2), the mean free path (22.3), the distribution of molecular speeds (22.4), equations of state for real gas (22.6), heat: energy and transit (23.1), the transfer of heat (23.2), the first law of thermodynamics (23.8), the application of the first law of thermodynamics (23.8), defining entropy change (24.2), entropy change for irreversible process (24.3), the second law of thermodynamics (24.4), entropy and the performance of engines (24.5), entropy and the performance of refrigerators (24.6), the efficiency of real engines (24.7)
Unit 3	**Special purpose diodes and Bipolar Junction Transistors (Electronic principles by A. P. Malvino, 6th Ed. Tata McGraw-Hill Ltd.)**
	The zener diode (5.1), the loaded zener regulator (5.2), optoelectronic devices (5.8), The unbiased transistor (6.1), the biased transistor (6.2), transistor currents (6.3), the CE connection (6.4), the base curve (6.5), collector curves (6.6)
Unit 4	**Optics (Optics by Ajoy Ghatak, 6th Ed. McGraw-Hill Education)**
	Introduction (12.1), Huygens' theory (12.2), rectilinear propagation (12.3), introduction (13.1), superposition of two sinusoidal waves (13.5), introduction (14.1), coherence (14.3), interference of light waves (14.4), the interference pattern (14.5), the intensity distribution (14.6), introduction (18.1), single slit diffraction pattern (18.2)

Suggested Books:

1. Electricity and Magnetism by A S Mahajan and A R Rangwala 7th Ed. Tata McGraw-Hill, 2003.
2. University Physics by H. D. Young, R. A. Freedman and A. Lewis Ford, 13th Ed. Pearson Education, 2013
3. Fundamentals of Optics by F. Jenkins and H. White, 4th Ed. McGraw Hill Education, 2017

Syllabus for F. Y. B. Sc. Sem II

Practical (PH – 203)

List of experiments

	Group A
1	Force constant (k) of a spring
2	Elastic constants (Y, η, K & σ) by Searle's method
3	Characteristics of photocell
4	"Y" by cantilever
5	"Y" by bending of a beam supported at two ends & loaded in the middle
6	Thermal conductivity of a bad conductor by Lee's method

	Group B
1	Study of magnetic field due to Solenoid
2	Characteristics of BJT (CE configuration)
3	Wattage of a lamp
4	Newton's rings experiment
5	To determine refractive index of the material of prism using spectrometer
6	Zener diode as a voltage regulator

Suggested Books

1. D.C.Tayal ,University Practical Physics, Edited by Ila Agarwal ,Himalayan Publishing House
2. B. L. Worsnop and H. T. Flint, Advanced Practical Physics, Asia Publishing House, New Delhi.
3. P. Khandelwal, A Laboratory Manual of Physics for Undergraduate Classes, Vani Publication House, New Delhi.
4. Geeta Sanon, BSc Practical Physics, 1st Edn. (2007), R. Chand & Co.

Note:

1. The duration of each experiment is of 2 hours. Two such experiments are to be performed by each student per week.
2. In the external exam, a student will have to perform two experiments, one from each group. The experiment will be of 2 hours duration.
3. It is recommended that there should not be more than 20 students per batch in the external exam.

Evaluation:

Pattern of end-semester examination

For Semesters I and III

1. The question paper will comprise of objective type questions totalling 50 marks.

2. There shall be negative marking of 25% marks per wrong questions attempted.

3. No marks will be deducted for not attempting a question.

For Semesters II, IV, V and VI

1. The question paper will be of 50 marks.

2. There shall be five questions carrying 10 marks each.

3. Question 1 will consist of 12 short answer questions of 1 mark each. A student can answer any 10 questions. Question 1 will cover the whole syllabus and 3 short answer questions will be asked from each unit.

4. Question 2 will be asked from unit 1, question 3 from unit 2, question 4 from unit 3 and question 5 from unit 4.

5. Question 2 onwards, each question will consist of option (a) or (b). Each question will include two sub-questions. Each sub-question will have theory based questions of 6 marks followed by one problem or application of 4 marks. A student should attempt any one of the two options (a) or (b).