–: પરિપત્ર :–

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન ભૌતિકશાસ્ત્ર વિષય ચલાવતી સ્નાતક કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, પેટાસમિતિએ તૈયાર કરેલ અભ્યાસક્રમ શૈક્ષણિક વર્ષ જુન ૨૦૨૦ થી અમલમાં આવનાર S.Y. B.Sc. Sem-III & IV (Physics) ભૌતિકશાસ્ત્રનો અભ્યાસક્રમ બોર્ડના ચેરમેનશ્રીએ બોર્ડવતી મંજૂર કરી વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરેલ છે. જે ભલામણ વિજ્ઞાન વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિજ્ઞાન વિદ્યાશાખાવતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલએ તેની તા. ૩૦/૦૬/૨૦૨૦ની સભાના ઠરાવ ક્રમાંકઃ૨૬ અન્વયે સ્વીકારી મંજૂર કરેલ છે. તેની જાણ સંબંધકર્તા શિક્ષકો અને વિદ્યાર્થીઓને કરવી, તદ્‌ઉપરાંત તેનો અમલ કરવો.

એકેડેમિક કાઉન્સિલની તા. ૩૦/૦૬/૨૦૨૦ ની સભાનાં ઠરાવ ક્રમાંકઃ ૨૬

::   આથી ઠરાવવામાં આવે છે કે, ભૌતિકશાસ્ત્ર વિષયની અભ્યાસસમિતિએ નીમેલ
પેટાસમિતિએ તૈયાર કરેલ શૈક્ષણિક વર્ષ જુન ૨૦૨૦ થી અમલમાં આવનાર S.Y.B.Sc.
Sem-III & IV (Physics) ભૌતિકશાસ્ત્રનો અભ્યાસક્રમ બોર્ડના ચેરમેનશ્રીએ બોર્ડવતી
તેમજ વિજ્ઞાન વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિજ્ઞાન વિદ્યાશાખાવતી સ્વીકારેલ, જે મંજૂર કરવામાં
આવે છે.

બિડાણઃ ઉપર મુજબ

ક્રમાંક : એકે./પરિપત્ર/૫૮૦૪/૨૦૨૦
તા. ૧૫–૦૭–૨૦૨૦

કુ.સા. કુલસચિવ

પ્રતિ,
૧)વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન ભૌતિકશાસ્ત્ર વિષય ચલાવતી સ્નાતક કોલેજોનાં 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 2020

B. Sc. (PHYSICS)

Semester III

Sr. No.	Course Code	Course Title	Credits
1	PH – 303	Physics Paper III	02
2	PH – 304	Physics Paper IV	02
3	PH – 305	Physics Paper V	02
4	PH – 306	Practicals	02

Faculty code: Science   **Subject code: PH**

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

External Examination Time Duration: 2 hrs.

Name of Exam	Semester	Paper No.	Course Group	Credit	Internal Marks	External Marks	Total Marks
B. Sc.	III	PH – 303	Theory	02	20	50	70
		PH – 304	Theory	02	20	50	70
		PH – 305	Theory	02	20	50	70
		PH – 306	Practical	02	20	60	80

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Proposed Syllabus for S. Y. B. Sc. Sem III

Physics Paper III (PH – 303)

Unit 1	**Kinetic theory of gases (Thermal Physics by Garg, Bansal and Ghosh, 2nd Ed., McGraw Hill Education (India) Pvt Ltd. Chennai, 2012)**
	Classical theory of heat capacities of gases (1.4), Distribution of Molecular velocities in a perfect gas (1.5), Energy distribution of a Maxwellian gas (1.6), Experimental verification of Maxwell's distribution law (1.7)
Unit 2	**Damped Oscillations (Oscillations and Waves by Garg, Ghosh and Gupta, 2nd Ed., PHI Learning PVt Ltd. New Delhi, 2009)**
	Introduction (4.1), Types of Damping forces (4.2), Equation of motion of a 1-D Damped Oscillator (4.3), Solutions of the Equation of motion of a 1-D Damped Oscillator (4.4), Non-mechanical damped system (4.5), Energy of a weakly damped system (4.6), Characterising weak damping (4.7)
Unit 3	**Forced Oscillations (Oscillations and Waves by Garg, Ghosh and Gupta, 2nd Ed., PHI Learning PVt Ltd. New Delhi, 2009)**
	Introduction (5.1), Free and forced scillations: Resonance (5.2), Forced oscillations of a 1-D weakly damped oscillator (5.3), Steady state behaviour of a 1-D weakly damped forced oscillator (5.4), Amplitude and resonance (5.5), Power absorbed by a weakly damped forced oscillator (5.6), Quality factor: Sharpness of resonance (5.7), A resonant LCR circuit (5.8)
Unit 4	**Charged Particles in Electromagnetic Fields (Electricity and Magnetism by D C Tayal, 4th Revised Ed., Himalaya Publishing House, India, 2019)**
	Charged particles in crossed electric and magnetic fields (11.8) (i) velocity selector, (ii) Hall effect, (iii) e/m by Thomson method, (iv) Mass spectrograph, Aston mass spectrograph (11.9), Dempster's mass spectrograph(11.10), Bainbridge's mass spectrograph(11.11), Electron optics (Electron microscope)(11.12).

Suggested books

1. Heat & Thermodynamics by Zemansky and Dittman, 8th Ed., McGraw Hill Education Pvt. Ltd. New Delhi, 2011.
2. Fundamentals of Statistical and Thermal Physics by F.Reif, 1st Indian Ed., Levant Books, 2010.
3. Elements of Electromagnetics by M N O Sadiku, Oxford University Press, 2001
4. Electricity and Magnetism by A S Mahajan and A R Rangwala 7thEd. Tata McGraw-Hill, 2003.

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Proposed Syllabus for S. Y. B. Sc. Sem III

Physics Paper IV (PH – 304)

Unit 1	**Wave Properties of Particles (Concepts of Modern Physics by Arthur Beiser, 6th Ed., Tata McGraw-Hill Publishing Co. Ltd. New Delhi, 2003)**
	De Broglie Waves (3.1), Waves of What? (3.2), Describing a Wave (3.3), Phase and Group Velocities (3.4), Particle Diffaraction(3.5), Particle in a Box (3.6), Uncertainty Principle-I (3.7), Uncertainty Principle-II (3.8), Applying the Uncertainty Principle (3.9).
Unit 2	**Atomic Structure (Concepts of Modern Physics by Arthur Beiser, 6th Ed., Tata McGraw-Hill Publishing Co. Ltd. New Delhi, 2003)**
	Atomic Structure (4.3),The Bohr Atom (4.4), Energy levels and Atomic Spectra (4.5), Correspondence Principle (4.6), Nuclear Motion (4.7), Atomic Excitation (4.8), The Laser (4.9).
Unit 3	**Fraunhofer Diffraction (Optics by Ajoy Ghatak 6th Ed., McGrawHill Education (India) Pvt. Ltd. New Delhi, 2017)**
	Diffraction by a Circular Aperture (18.3), Resolving Power of a Microscope(18.5.1), The Diffraction Grating (18.8), The Grating Spectrum (18.8.1), Resolving Power of a Grating(18.8.2), Resolving Power of a Prism(18.8.3), Oblique Incidence(18.9), X-ray Diffraction (18.10).
Unit 4	**Aberrations (Optics by Ajoy Ghatak 6th Ed., McGrawHill Education (India) Pvt. Ltd. New Delhi, 2017)**
	Introduction (6.1), Chromatic aberration (6.2), The achromatic doublet (6.2.1), Removal of chromatic aberration of a spherical doublet (6.2.2), Monochromatic aberrations (6.3), Spherical aberration (6.3.1), Coma (6.3.2), astigmatism and curvature of field (6.3.3), Distortion (6.4)

Suggestedbooks

1. Modern Physics by Kenneth Krane
2. Fundamentals of Optics by Jenkins and White
3. Optics by Eugene Hecht

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Proposed Syllabus for S. Y. B. Sc. Sem III

Physics Paper V (PH – 305)

Unit 1	Complex variable (Mathematical Physics by B. S. Rajput, Pragati Prakashan, India, 2013)
	Function of complex variable (4.7), Analytical Function (4.8), Complex integration (4.11), Some special integrals (without proof) (4.12), Cauchy's theorem (without proof) (4.13), Cauchy's integral formula (without proof) (4.14), zeroes and singularities of complex functions (4.19), Residue (4.20), Cauchy's residue theorem (without proof) (4.21)
Unit 2	Thermoelectricity (Electricity and Magnetism by D C Tayal, 4th Revised Ed., Himalaya Publishing House, India, 2019)
	Seeback Effect(9.1), Peltier Effect(9.2), Thomson Effect(9.3),Measurement of thermos emf(9.8),Applications of thermos emf (9.9) (i)Thermopyle (ii) Bolometer (iii)Boy's radio micrometer (iv) Duddle thermos galvanometer (v) Thermoelectric pyrometer (vi) Thermo milliameter.
Unit 3	Transistor Biasing and AC Models (Electronics Principles by Malvino, 6th Ed., Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 1999)
	Voltage Sources(1.3), Current Sources (1.4) ,Thevinin's Theorem(1.5),Norton's Theorem(1.6), Voltage Divider Bias(8.1),Accurate VDB analysis(8.2),VDB load line & Q point(8.3),Two-Supply Emitter Bias(8-4),Other types of Biases(8.5),Troubleshooting (8.6), PNP transistors (8.7), Base-Baised Amplifier(9.1), Emitter-Baised Amplifier (9.2), Small-Signal operation(9.3), AC Beta(9.4), AC Resistance of the Emitter Diode(9.5), Two Transistor Models(9.6), Analyzing an Amplifier (9.7), AC quantities on the Data Sheet (9.8).
Unit 4	Voltage and Power Amplifiers (Electronics Principles by Malvino, 6th Ed., Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 1999)
	Voltage gain (10.1), The loading effect of input inpedance (10.2), Multistatge amplifier (10.3), Swamped amplifier (10.4), Two stage feedback (10.5) Amplifier terms (11.1), Two load lines (11.2), Class A operation (11.3), Class B operation (11.4), Class C operation (11.5), Class C formulas (11.6), Transistor power rating (11.7)

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 7$_{th}$Ed. Tata McGraw-Hill, 2003.
3. Electronic Devices and Circuit Theory by Boylestad
4. Mathematical Methods in the Physical sciences: Mary L. Boas Wiley India, 3rd ed.

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Proposed Practicals for S. Y. B. Sc. Sem III

PH-306

LIST OF EXPERIMENTS

	GROUP A
1	To Study Simple and Damped Harmonic Motion
2	To study the oscillations of a bar pendulum
3	To determine the Boltzmann's constant using V-I characteristics of PN diode
4	To verify Stefan's fourth power law
5	To study the variation of thermo-emf with temperature
	GROUP B
1	To determine wavelength of spectral lines by plane transmission grating.(Minimum Deviation Method)
2	To determine the resolving power of a Prism
3	To study spherical aberration of a Plano-convex lens
4	To study diffraction by cylindrical obstacle.
5.	To find Cauchy's Constant.
	GROUP C
1	To find band gap of a semiconding material
2	To determine temperature coefficient of resistance of the given thermistor
3	To Verify Thevenin's theorem and to find equivalent Voltage of source circuit
4	To Verify Norton's theorem and to find equivalent Norton's components
5	To study series resonance in LCR circuit

Suggested books:

1. D.C.Tayal ,University Practical physics,Edited by Ila Agarwal ,Himalaya 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. Three such experiments are to beperformed by each student per week.
2. In the external exam, a student will have to perform three experiments, one fromeach group. Each experiment will be of 2 hours duration.
3. There shall not be more than 20 students per batch in the external exam.