DWARAKA DOSS GOVERDHAN DOSS VAISHNAV COLLEGE

(Linguistic Minority Institution)

[AUTONOMOUS]

Accredited at 'A' Grade by NAAC

B.Sc. PHYSICS SYLLABUS

(Effective from 2011-2012)

"Gokulbagh" 833, Periyar E.V.R. Salai,

Arumbakkam, Chennai – 600106. Ph: 2475 4349

E-mail: dgvcollge@eth.net

ANNEXURE – II

Question Paper Pattern for B.Sc Physics Degree Course based on CBCS Pattern

(except non-major elective)

THEORY

Maximum Ext. Marks: 75

Duration: 3 hours

PART A (50 words)

To answer 10 questions

out of 12 questions 10x2marks=20 marks

PART B (200 words)

To answer 5 questions

out of 7 question 5X5 marks=25 marks

PART C (500 words)

To answer 3 questions

out of 5 question 3X10marks=30 marks

Total 75 marks

ANNEXURE – III

Pattern of Internal Evaluation for B.Sc Physics Degree Course

based on CBCS Pattern

THEORY

Maximum Int. Marks: 25

Best Two tests out of 3	15 marks
Attendance	5 marks
Assignment/Seminar	5 marks

PRACTICAL

Maximum Int. Marks: 40

Attendance	5 marks
Practical Tests best 2 out of 3	30 marks
Record	5 marks

. . . . .

DWARAKA DOSS GOVERDHAN DOSS VAISHNAV COLLEGE
(Linguistic Minority Institution)
[AUTONOMOUS]

Accredited at 'A' Grade by NAAC

DEPARTMENT OF PHYSICS
B.Sc DEGREE COURSE IN PHYSICS

Syllabus

Semester – III

Core Paper – 3

OPTICS
(Effective from 2011-2012)

No. of credits: 5

No. of hours allotted: 5/ Week

Unit 1: Geometrical Optics

Refraction – laws of refraction – refractive index using a microscope – critical angle – air cell – refraction through a prism – angle of minimum deviation – dispersion through a prism – spectrum – dispersive power - Combination of two small angled prisms to produce dispersion without deviation - deviation without dispersion - defects of images – coma – distortion - Spherical aberration in lenses - methods of minimizing spherical aberration - condition for minimum spherical aberration in the case of two lenses separated by a distance - Chromatic aberration in lenses - Condition for achromatism of two thin lenses (in and out of contact) – achromatic prisms.

Unit 2: Interference

Analytical treatment of interference - expression for intensity - condition for maxima and minima in terms of phase and path difference – interference in thin films – colours of thin films - Air wedge - determination of diameter of thin wire - test for optical flatness - Haidinger's fringes - Michelson's interferometer - theory - applications - determination of wavelength - thickness of thin transparent material - resolution of interferometer.

Unit 3: Diffraction

Fresnel diffraction - diffraction at a circular aperture – at a narrow wire - Fraunhoffer diffraction - single slit - double slit - (simple theory). Plane transmission grating – theory – normal incidence – experimental determination of wavelength using grating - oblique incidence (theory) - Dispersive power of a grating - Rayleigh's criterion for resolution - limit of resolution of the eye - resolving power of telescope, microscope - Difference between resolving power and dispersive power.

Unit 4: Polarization

Double refraction - Nicol prism -polarizer and analyzer - Huygen's explanation of double refraction in uniaxial crystals - dichroism - polaroids and their uses - quarter wave plate - halfwave plate - plane, elliptically and circularly polarized light - production and detection - Babinet's compensator - optical activity - Fresnel's explanation of optical activity - specific rotatory power - determination using Laurent's half shade polarimeter.

Unit 5: Spectroscopy

Introduction to spectroscopy - Electromagnetic spectrum - characterization of electro magnetic radiation - quantization of energy - regions of the spectrum – (application of various regions of spectrum in medicine, research and technology)* - Brownian motion – Tyndall effect - scattering of light – blue of the sky – halo of the moon - (life of Sir C.V. Raman)* - Raman effect - experimental set up - Characteristics of Raman lines - Lasers - ruby laser - He-Ne laser, CO_2 laser - construction and working - application of lasers.

*Assignment, not for exams

Books for Study

1. A Text book of Optics by Subrahmanyam N., Brij Lal and M.N. Avadhanulu, S.Chand & Co., New Delhi (2006).
2. Optics by Khanna D.R. & Gulati H.R., S.Chand & Co., New Delhi (1979).
3. Optics and Spectroscopy by R.Murugeshan and Kiruthiga Sivaprasath, S. Chand & Co., New Delhi (2006).
4. Molecular structure and spectroscopy by Aruldhas, Prentice Hall of India Pvt. Ltd., New Delhi (2005).

Books for Reference

1. Fundamentals of Physics, by D.Halliday, R. Resnick and J. Walker, Wiley, 6th Edition, New York (2001)
2. Optics by Ajay Ghatak, Tata McGraw-Hill publishing Co. Ltd., New Delhi (1998)
3. Spectroscopy by Gurdeep Chatwal, Sham Anand, Himalaya Publishing House (1990)

Semester – IV

Core Paper – 4

ATOMIC PHYSICS
(Effective from 2011-2012)

No. of credits: 5

No. of hours allotted: 5/ Week

Unit 1: Discharge phenomenon through gases

Movement of charge in transverse electric and magnetic fields - specific charge of an electron - Dunnington's method - magnetron method - positive rays – Dempster's mass spectrograph – Bainbridge mass spectrograph - critical potential – experimental determination of critical potential – Frank and Hertz experiment – Davis and Gaucher experiment.

Unit 2 : Photo-electric effect

Richardson and Compton experiment - Laws of photoelectric emission – Einstein's photo electric equation – (Nobel Prize for Einstein)* - Experimental verification of Einstein's photo electric equation by Millikan's experiment - photo electric cell - photo emissive cell - photovoltaic cell - photo conducting cell - photomultiplier.

Unit 3: Atomic structure

(History of development of various atomic models) * - Bohr atom model - Sommerfield atom model – various quantum numbers - Vector atom model - Pauli's exclusion principle - electronic configuration of elements and periodic classification - coupling schemes - LS and JJ coupling - spatial quantization - Stern and Gerlach experiment - Bohr magneton.

Unit 4: Fine structure of spectral lines

Spectral terms and notations - selection rules - intensity rule and interval rule - fine structure of sodium D lines - Zeeman effect – Zeeman shift - Larmor's theorem - Debye's explanation of normal Zeeman effect - anamalous Zeeman effect - theoretical explanation - Lande's `g' factor - explanation of splitting of D1 and D2 lines of sodium - Paschen - Back effect - Stark effect (qualitative study only).

Unit 5: X-Rays

X- rays - continuous X-rays - characteristic X-ray spectra – absorption of X-rays by matter – Moseley's law - diffraction of X- rays - Bragg's law in one dimension – Bragg's spectrometer - uses of X- rays - Compton effect – expression for Compton shift in wavelength - experimental verification.

***Assignment, not for exams**

Books for Study

1. Atomic Physics by J.B. Rajam, S. Chand & Co., 20th Edition, New Delhi (2004).
2. Modern Physics by D.L.Sehgal, K.L.Chopra and N.K.Sehgal., Sultan Chand & Sons Publication, 7th Edition, New Delhi (1991).
3. Atomic and Nuclear Physics by N. Subrahmanyam and BrijLal, S. Chand & Co. 5th Edition, New Delhi (2000).
4. Modern Physics by R. Murugeshan, Kiruthiga Sivaprasath, S. Chand & Co., New Delhi (2008).

Book for Reference:

1. Modern Physics by J.H. Hamilton and Yang, McGraw-Hill Publication, (1996).
2. Concepts of Modern Physics by A. Beiser, Tata McGraw-Hill, New Delhi (1997).
3. Fundamentals of Physics by D.Halliday, R.Resnick and J. Walker, Wiley, 6th Edition, New York (2001).
4. Modern Physics by Kenneth S.Krane, John Willey & sons, Canada (1998).

CORE PRACTICAL – II

(Practical Examination at the end of the Fourth semester)

No. of credits: 4

External: 60 marks. Record: 10 marks Practical Exam: 50 marks

1. Young's modulus - cantilever - depression - Static method-Scale and telescope
2. Young's modulus - cantilever oscillations - Dynamic method
3. Rigidity modulus - Static torsion
4. Compound pendulum - g and k
5. Sonometer - A.C. Frequency - Using Steel wire.
6. Melde's string - frequency, Relative Density of a solid and liquid
7. Thermal conductivity of a bad conductor - Lee's disc method
8. Spectrometer - μ of a glass prism - i-d Curve
9. Spectrometer - Grating N and λ - normal incidence method
10. Spectrometer - Grating N and λ - minimum deviation method
11. Air wedge - Thickness of a wire
12. m and B_H - deflection mangetometer Tan C position and vibration magnetometer
13. Carey Foster's bridge - Temperature coefficient of resistance of a coil
14. Potentiometer - Calibration of low range voltmeter
15. Potentiometer - Ammeter calibration.
16. Figure of merit of galvanometer (Mirror Galvanometer Or Table Galvanometer)

Note: Use of Digital balance is permitted

The following procedure is to be followed for internal marks (40 marks)

Attendance: 5 marks

Practical test – best 2 out of 3: 30 marks

Record: 5 marks.