St. Gregorios College, Kottarakkara
Department of Physics
Programme: B.Sc Chemistry

SEMESTER III: June – November

Academic Year: 2015-2016

Course Delivery Plan

WEEKS	NAME OF THE COURSE: PY1331.2- OPTICS, MAGNETISM & ELECTRICITY 1 HOUR A WEEK	Remarks
Week-1	Interference-Principle of superposition, Coherence.	
Week-2	Types of interference, Conditions for obtaining a sustained interference pattern, Analytical treatment of interference.	
Week-3	Theory of interference fringes and bandwidth.	
Week-4	Interference in thin films-reflected system.	
Week-5	Colour of thin films, Fringes of equal inclination, equal thickness and equal chromatic order.	
Week-6	Newton's rings-reflected system-measurement of wavelength.	
Week-7	Problems on Interference.	
Week-8	Phenomenon of diffraction-classification-Fresnel and Fraunhoffer.	
Week-9	Fresnel's theory of approximate rectilinear propagation of light – Fresnel zones.	
Week-10	Division of a cylindrical wave front.	
Week-11	Fresnel diffraction at a straight edge.	
Week-12	Fraunhoffer diffraction at a single slit.	
Week-13	Fraunhoffer diffraction at two slits.	
Week-14	Fraunhoffer diffraction at N slits.	
Week-15	Theory of plane transmission grating	
Week-16	Plane transmission grating- determination of wavelength.	
Week-17	Resolving power of grating.	
Week-18	Problems on Diffraction.	
Signature (in-charge)	Rejani Koshy	
Internal Exams	NOVEMBER	
Level Exit Exams	NOVEMBER	

Name of Course Instructors: REJANI V. KOSHY

ST. GREGORIOS COLLEGE ★ Accredited by NAAC with B Grade ★ KOTTARAKARA

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Head of the Department

St. Gregorios College, Kottarakkara
Department of Physics
Programme: B.Sc Chemistry

SEMESTER IV: November - March **Academic Year: 2016-2017**

Course Delivery Plan

WEEKS	NAME OF THE COURSE: PY1431.2– ATOMIC PHYSICS, QUANTUM MECHANICS AND ELECTRONICS 1 HOUR A WEEK	Remarks
Week-1	EM spectrum-UV, Visible, IR, Radio and microwave regions.	
Week-2	Principle of various spectrometers used in specific regions of EM spectrum-Microwave, Infrared.	
Week-3	Principle of various spectrometers used in specific regions of EM spectrum – UV-Vis Spectrophotometer.	
Week-4	Absorption spectroscopy, Emission spectroscopy, Mass spectroscopy.	
Week-5	ESR principle.	
Week-6	ESR spectrometer.	
Week-7	NMR principle.	
Week-8	NMR spectrometer.	
Week-9	Models of Atom- Introduction.	
Week-10	Basic features of Bohr atom model, Limitations.	
Week-11	Derivation of radius of an orbit, Velocity of electron.	
Week-12	Hydrogen spectrum-series.	
Week-13	Bohr's correspondence principle.	
Week-14	Vector atom model- Spatial quantization & Spin of Electron.	
Week-15	Various quantum numbers associated with Vector atom model.	
Week-16	Magnetic moment of orbital electrons.	
Week-17	Electron spin-Spin-Orbit coupling.	
Week-18	Coupling Schemes- L.S. Coupling, J.J. Coupling.	
Week-19	Pauli's exclusion principle-periodic table.	
Week-20	Problems on Atomic physics.	
Signature (in-charge)		
Internal Exams	MARCH	
Level Exit Exams	MARCH	

Name of Course Instructors: REJANI V. KOSHY

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Department of Physics
Programme: B.Sc Mathematics

SEMESTER III: June – November

Academic Year: 2017-2018

Course Delivery Plan

WEEKS	NAME OF THE COURSE: PY1331.1 – OPTICS, MAGNETISM AND ELECTRICITY 1 HOUR A WEEK	Remarks
Week-1	Interference-Principle of superposition, Coherence.	
Week-2	Types of interference, Conditions for obtaining a sustained interference pattern, Analytical treatment of interference.	
Week-3	Theory of interference fringes and bandwidth.	
Week-4	Interference in thin films-reflected system.	
Week-5	Colour of thin films, Fringes of equal inclination, equal thickness and equal chromatic order.	
Week-6	Newton's rings-reflected system-measurement of wavelength and refractive index of a liquid.	
Week-7	Problems on Interference.	
Week-8	Phenomenon of diffraction-classification-Fresnel and Fraunhoffer.	
Week-9	Fresnel's theory of approximate rectilinear propagation of light – Fresnel zones.	
Week-10	Division of a cylindrical wave front.	
Week-11	Fresnel diffraction at a straight edge.	
Week-12	Fresnel diffraction at a circular aperture.	
Week-13	Fraunhoffer diffraction at a single slit.	
Week-14	Fraunhoffer diffraction at two slits.	
Week-15	Fraunhoffer diffraction at N slits, Theory of plane transmission grating	
Week-16	Plane transmission grating- determination of wavelength.	
Week-17	Resolving power of grating.	
Week-18	Problems on Diffraction.	
Signature (in-charge)		
Internal Exams	NOVEMBER	
Level Exit Exams	NOVEMBER	

Name of Course Instructors: REJANI V. KOSHY

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SEMESTER VI: November - March Academic Year: 2018-2019

Course Delivery Plan

WEEKS	NAME OF THE COURSE: PY1643- CLASSICAL AND MODERN OPTICS 3 HOURS A WEEK	Remarks
Week-1	The principle of superposition - coherent sources – Analytical Theory of Interference, Double slit interference (theory of interference fringes and band width).	
Week-2	Interference by division of wave front and amplitude – Fresnel's biprism. Conditions for obtaining a sustained interference pattern.	
Week-3	Interference in thin films – fringes of equal inclination, fringes of equal thickness, fringes of equal chromatic order.	
Week-4	Wedge shaped films- testing of optical flatness - Newton's rings (reflected system)-refractive index of a liquid.	
Week-5	Michelson interferometer – determination of wavelength, Problems on Interference.	
Week-6	Phenomenon of Diffraction, Classification- Fresnel and Fraunhoffer Diffraction, Fresnel diffraction: - Half-period zones.	
Week-7	Explanation of rectilinear propagation of light– Division of cylindrical wave front, Diffraction at a straight edge.	
Week-8	Fraunhoffer diffraction - Diffraction at a single slit, Diffraction at double slits, Theory of plane transmission grating.	
Week-9	Determination of wavelength using plane transmission grating, Rayleigh's criterion for resolution - resolving power of diffraction grating, Problems.	
Week-10	Plane polarized light - polarization by reflection – Brewster's law, Pile of plates - Malus law - Double refraction.	
Week-11	Huygens explanation for double refraction in uniaxial crystals - Nicol prism - Nicol prism as a polarizer and analyzer.	
Week-12	Theory of production and analysis of plane, circularly and elliptically polarized light.	
Week-13	Quarter and half wave plates, Problems on Polarization.	
Signature (in-charge)		
Internal Exams	MARCH	
Level Exit Exams	MARCH	

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SEMESTER II: November - March **Academic Year: 2019-2020**

Course Delivery Plan

WEEKS	NAME OF THE COURSE: PH 221 MODERN OPTICS AND ELECTROMAGNETIC THEORY 2 HOURS A WEEK	Remarks
Week-1	Introduction to Relativistic Electrodynamics, Vector and scalar potential-	
Week-2	Gauge transformations- Coulomb gauge and Lorentz gauge- Magnetism as a relativistic phenomenon.	
Week-3	Transformation of the field-electric field of a uniformly moving point charge.	
Week-4	Electrodynamics in tensor notation-electromagnetic field tensor	
Week-5	Potential formulation of relativistic electrodynamics	
Week-6	Electromagnetic wave equations-electromagnetic waves in non-conducting media.	
Week-7	Plane waves in vacuum-energy and momentum of electromagnetic waves.	
Week-8	Propagation through linear media-reflection and transmission at normal incidence	
Week-9	Propagation through linear media-reflection and transmission at oblique incidence	
Week-10	Electromagnetic waves in conductors-modified wave equations and	
Week-11	Plane waves in conducting media-reflection and transmission at a conducting interface	
Week-12	Problems and Discussion on University Questions.	
Week-13	Wave guides- applications	
Week-14	Rectangular wave guides.	
Week-15	Transverse magnetic (TM) modes	
Week-16	Transverse electric (TE) modes	
Week-17	Wave propagation in the wave guide	
Week-18	Power transmission and attenuation	
Signature (in-charge)		
Internal Exams	MARCH	
Level Exit Exams	MARCH	

Name of Course Instructors: REJANEY JOSHY

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