STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI - 600 086

B.Sc. DEGREE : BRANCH III - PHYSICS

COURSES OF STUDY OFFERED

(Effective from the academic year 2011 - 2012)

CHOICE BASED CREDIT SYSTEM

Subject Code	Title of Course	Credits	Total Hours			Exam Hours	Marks		
			Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)		Continuous Assessment	End Semester	Maximum
Semester - I									
11PH/MC/PA14	Properties of Matter and Atomic Physics	4	4	1	0	3	50	50	100
11PH/MC/BE14	Basic Electronics	4	4	1	0	3	50	50	100
11PH/MC/P112	Experimental Physics - I	2	0	0	3	3	50	50	100
Allied Core Offered to the Department of Mathematics									
11PH/AC/PM13	Physics for Mathematics - I	3	3	0	0	3	50	50	100
11PH/AC/P111	Physics for Mathematics - I Practical	1	0	0	2	3	50	50	100
Semester - II									
11PH/MC/TS24	Thermal Physics and Statistical Mechanics	4	4	1	0	3	50	50	100
11PH/MC/ME24	Mechanics	4	4	1	0	3	50	50	100
11PH/MC/P222	Experimental Physics - II	2	0	0	3	3	50	50	100
11PH/GC/ES22	Environmental Studies	2	2	0	0	-	50	-	100
Allied Core Offered to the Department of Mathematics									
11PH/AC/PM23	Physics for Mathematics - II	3	3	0	0	3	50	50	100
11PH/AC/P221	Physics for Mathematics - II Practical	1	0	0	2	3	50	50	100
Semester - III									
11PH/MC/MP34	Mathematical Physics	4	4	1	0	3	50	50	100
11PH/MC/P332	Experimental Physics - III	2	0	0	3	3	50	50	100
Allied Core Offered to the Department of Chemistry									
11PH/AC/PC33	Physics for Chemistry - I	3	3	0	0	3	50	50	100
11PH/AC/P131	Physics for Chemistry - I Practical	1	0	0	2	3	50	50	100
11PH/SA/CW32	Child Welfare	2	2	0	0	-	50	-	100
Semester - IV									
11PH/MC/OS44	Optics and Spectroscopy	4	4	1	0	3	50	50	100
11PH/MC/P442	Experimental Physics - IV	2	0	0	3	3	50	50	100
11PH/MC/P542	Experimental Physics - V- Electronics	2	0	0	3	3	50	50	100
Allied Core Offered to the Department of Chemistry									
11PH/AC/PC43	Physics for Chemistry - II	3	3	0	0	3	50	50	100
11PH/AC/P241	Physics for Chemistry - II Practical	1	0	0	2	3	50	50	100

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B.Sc. DEGREE : BRANCH III - PHYSICS

COURSES OF STUDY OFFERED

(Effective from the academic year 2011 - 2012)

CHOICE BASED CREDIT SYSTEM

Subject Code	Title of Course	Credits	Total Hours			Exam Hours	Marks		
			Lecture Hours (L)	Tutorial Hours (T)	Practical Hours (P)		Continuous Assessment	End Semester	Maximum
Semester - V									
11PH/MC/EM54	Electromagnetism	4	4	1	0	3	50	50	100
11PH/MC/MM54	Microprocessors and Microcontrollers	4	4	1	0	3	50	50	100
11PH/MC/SS54	Solid State Physics	4	4	1	0	3	50	50	100
11PH/MC/P652	Experimental Physics - VI	2	0	0	3	3	50	50	100
11PH/MC/P752	Experimental Physics - VII- Electronics	2	0	0	3	3	50	50	100
11PH/ME/BM53	Biomedical Physics(Skilled development course)	3	3	1	0	3	50	50	100
OR									
11PH/ME/CS53	Communication Systems (Skilled development course)	3	3	1	0	3	50	50	100
Semester - VI									
11PH/MC/SE64	Semiconductor Electronics	4	4	1	0	3	50	50	100
11PH/MC/QR64	Quantum Mechanics and Relativity	4	4	1	0	3	50	50	100
11PH/MC/NP64	Nuclear Physics	4	4	1	0	3	50	50	100
11PH/MC/P862	Experimental Physics - VIII	2	0	0	3	3	50	50	100
11PH/ME/LP63	Laser Physics	3	3	1	0	3	50	50	100
OR									
11PH/ME/NS63	Nano Science	3	3	1	0	3	50	50	100
General Elective Courses									
11PH/GE/BP32	Basics of Photography	2	1	0	1	-	50	-	100
11PH/GE/DE32	Digital Electronics	2	1	0	1	-	50	-	100
11PH/GE/PG44	Photography	4	2	0	2	3	50	50	100
11PH/GE/HE44	Home Electrical Installations	4	4	0	0	3	50	50	100
11PH/GE/AP44	Astrophysics	4	4	0	0	3	50	50	100
Independent Elective Courses									
11PH/UI/GP23	Geo Physics	3	-	-	-	3	-	50	100
11PH/UI/TP23	Techniques of Photography	3	-	-	-	3	-	50	100

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.A. / B.Sc. / B.Com / B.C.A. / B.V.A. / B.S.W. DEGREE

SYLLABUS
(Effective from the Academic Year 2011 – 2012)

ENVIRONMENTAL STUDIES

CODE : 11PH /GC/ES 12 **CREDIT : 2**
L T P : 2 0 0
TOTAL TEACHING HOUR : 26

OBJECTIVES OF THE COURSE

- To create an awareness about Current environmental issues
- To educate the students about conservation and management of natural resources
- To make the students ecosensitive and ecofriendly.

Unit 1 **(6 Hrs)**

Introduction

1.1 Components of the environment – Classification and characteristics of resources – Renewable and non – renewable resources

1.2 Need for Public awareness in conservation of natural resources

1.3 Energy Flow in ecosystems – aquatic and terrestirial – food chain and food web.

Unit 2 **(10 Hrs)**

Pollution and Socio Economic Aspects of the Environment

2.1. Types of pollution – Air, Water, Solid Waste, Noise

2.2. Problems - green house effect – depletion of the ozone layer – climate change

2.3. Bio diversity - Definition - Loss of bio diversity – Threats to biodiversity and Conservation of biodiversity.

2.4. Human behaviour: - Population – urbanization – poverty (as cause and result of pollution and degradation)

2.5. Technology: - Agriculture and industry – deforestation. Use, Misuse and Abuse of the resources

2.6. Effects and consequences of environmental problems.

Unit 3 **(10 Hrs)**

Sustainable Development, Remedies and Policy Implications

3.1 Environmental disasters natural and human made – Bhopal gas Tragedy – Chernobyl Accident – Fukushima Nuclear Crisis - Gulf War – Love Canal Episode – Tsunami – Volcanic eruptions.

3.2 Methods evolved to measure and check environmental degradation and pollution – carbon footprint, carbon credit, ecological footprint, and ecological shadow.

3.3 Environmental movements in India – Chipko movement, Narmada bachao Andolan, Sethu Samudram Project

3.4 Environmental Acts – Policy measures with respect to India.

3.5 International environmental agreement – Stockholm Conference – Montreal protocol – RIO Meet – Kyoto Conference – UN conference on Climate change (Copenhagen)

Field visit

Eco initiatives at the campus : Garbage segregation and Vermicomposting – Graywater recycling – Rainwater harvesting – Solar powered lights – Bio diversity.

TEXT BOOK

Bharucha, E., Textbook of Environmental Studies**,** (1st edition), Hyderabad, Universities Press, 2005.

BOOKS FOR REFERENCE

Ignacimuthu, S. Environmental Awareness and Protection**,** New Delhi., Phoenic Publishing House, 1997.

Jadhav, H and V. M. Bhosale. Environmental Protection and Laws, New Delhi, Himalaya Publication House, 1995.

Odum, E.P. Fundamentals of Ecology**,** W.B. Sauders Co., U.S.A. 1971.

Mies, M. and V. Shiva. Ecofeminism, London. Zed Books, 1989.

Singh, H.R., Environmental Biology**,** (1st edition), New Delhi, S.Chand and Co., Ltd., 2005.

PATTERN OF EVALUATION (Totally Internal)

CONTINUOUS ASSESSMENT (CA): One Hour Test – 25 Marks
One Component – 25 Marks

STELLA MARIS COLLEGE (AUTONOMOUS), CHENAI-600 086

B.Sc. DEGREE: BRANCH III – PHYSICS

SYLLABUS

(Effective from the academic year 2011 – 2012)

BASIC ELECTRONICS

CODE:11PH/MC/BE14 **CREDITS: 4**

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To understand the concept of digital principles as applied to microprocessors and computers.
- To develop knowledge in combinational logic and sequential logic circuits and their applications.

Unit 1 **(13 Hrs)**

Circuit analysis

1.1 Linear circuit analysis –Ohm's law- open and short circuits-Kirchoff's law-The voltage divider circuit.

1.2 Superposition theorem – Energy sources – transfer theorems – Thevenin's theorems – Norton's theorem.

1.3 Maximum power transfer theorem – Simple network analysis

Unit 2 **(13 hrs)**

Number system, Binary concept, and logic gates.

2.1 Decimal, Binary, Octel and Hexa number systems

2.2 Binary arithmetic – principles of addition –subtraction- 1s complement and 2s complement method - multiplication and division

2.3 Universal gates – NAND , NOR building blocks – AND law – OR law – Commutative Law– Associative law – Distributive law – Law of absorption

Unit 3 **(13 hrs)**

Boolean algebra, digital arithmetic circuits and K-map

3.1 De Morgan's theorem –Algebraic simplification – implementation of Boolean algebra into circuits

3.2 Half adder – full adder – half subtractor – full subtractor - parallel binary adder.

3.3 Fundamental products – sum of products –product of sums - K- Maps up to four variables. K- Map simplification – realization of logic circuits – NAND-NAND circuits.

Unit 4 **(13 hrs)**

Flip - flops, registers and counters

4.1 Flip-flops : RS, clocked RS, JK and Master slave Flip-flops and their truth tables.

4.2 Registers: Shift registers – right shift - left shift registers.
4.3 Counters: Binary ripple counter -down counter – modulus counter – decade counter – seven segment display.

Unit 5 (13 hrs)

Integrated circuits – fabrication and characteristics

5.1 Integrated circuit technology: scale of integration –SSI, MSI, LSI, BLSI.
5.2 Basic monolithic integrated circuits – Fabrication process-epitaxial growth – masking and etching - Diffusion of impurities.
5.3 Transistors for monolithic circuits – monolithic diodes – integrated resistors- and capacitors.

BOOKS FOR STUDY

Malvino Albert Paul, Electronic Principles**,** Tata McGraw Hill Pub.Co., Ltd., New Delhi, (1984),

Malvino Albert Paul and Leach Donald, Digital Principles and Application Tata McGraw Hill Pub. Co., Ltd., New Delhi, (1981).

Mehta V.K, Electronic Principles, S. Chand and company, New Delhi,(2005).

BOOKS FOR REFRENCE

Allen Mottershead, Electronic devices and circuits, Prentice Hall of India Pvt., Ltd., New Delhi, (1982),

Ambrose A & T. Vincent Devaraj, Elements of solid state electronics**,** Meera publications K.K. Dist, (1990).

Floyd Thomas L., Digital fundamentals , Universal Book Stall, New Delhi,(1997).

Milmann and Halkias, Integrated electronics, Tata McGraw Hill Pub.Co., Ltd., New Delhi.,(1992).

Sedha R.S Applied Electronics, S Chand and company, New Delhi,(1997).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered) in 30 minutes
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5
Section B – 5 x 5 = 25 Marks (5 out of 7 to be answered (5 problems & 2 theory))
Section C – 3 x 15 = 45 Marks (3 out of 5 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. PHYSICS : BRANCH III – PHYSICS

SYLLABUS
(Effective from the Academic year 2011-2012)

EXPERIMENTAL PHYSICS – I

CODE: 11PH/MC/P112 **CREDITS : 2**
L T P : 0 0 3*
TOTAL HOURS : 39

OBJECTIVE

- To expose students to the technique of handling the measuring instruments.

1. Compound Pendulum
2. Young's modulus - Pin and Microscope – Non-Uniform Bending.
3. Young's modulus - uniform bending – scale and telescope.
4. Surface Tension - drop weight method and Interfacial Surface Tension
5. Rigidity modulus 'G' using torsion pendulum with weights.
6. Lees Disc – Thermal conductivity of a bad conductor.
7. Spectrometer – Determination of the Refractive index of the material of solid and liquid prism.
8. Field along the axis of the coil carrying current - Determination of H and B_H
9. Computer simulated experiment.

* At least 8 experiments to be selected by the course teacher.
* 1 practical session of 3 hours duration per week .

BOOK FOR STUDY

Ouseph,C. C., V. Srinivasan and R. Balakrishnan, A Text Book of Practical Physics, Vol. I & II., S.Viswanathan Pvt., Ltd. Madras(1992**)**.

PATTERN OF EVALUATION

Total Marks : 50 Duration : 3 hrs

Formula & Procedure	20
Observation	20
Calculation & Result	10

STELLA MARIS COLLEGE (AUTONOMOUS), CHENAI-600 086

B.Sc. DEGREE: BRANCH III – PHYSICS

SYLLABUS

(Effective from the academic year 2011 – 2012)

PROPERTIES OF MATTER AND ATOMIC PHYSICS

CODE:11PH/MC/PA14 **CREDITS : 4**

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To give the students a firm understanding of properties of matter.
- To enable the students to understand the fundamental concepts of atomic physics and its application in various fields.

Unit 1 **(13 Hrs)**

Elasticity

1.1 Elasticity - different modulii of elasticity- relation between the elastic modulii - bending of beams – expression for the bending moment – depression of the loaded end of a cantilever – expression for depression at the midpoint of a beam loaded at the centre (non-uniform bending) experiment to determine Young's modulus 'E'-expression for elevation at the centre of a beam (uniform bending) - experiment to determine 'E'.

1.2 Torsion-expression for torque per unit twist-work done in twisting a wire-torsional oscillation of a body – expression for time period of torsional oscillation- experiment to determine rigidity modulus 'n'.

Unit 2 **(13 Hrs)**

Surface tension

2.1 Surface tension-explanation of surface tension on the basis of kinetic theory-work done in increasing the surface area-angle of contact-excess of pressure inside a curved liquid surface.

2.2 Jaegar's method-Quincke's drop-Vapour pressure over flat and curved surfaces.

Unit 3 **(13 Hrs)**

Viscosity and low pressure

3.1 Viscosity-coefficient of viscosity-Newton's law-Poiseuilles flow-Stoke's law-Rotation Viscometer-Ostwald viscometer-variation of viscosity with temperature-Air pump-McLeod gauge.

3.2 Stream line flow-turbulent flow-critical velocity-Reynold's number- Euler's equation

Unit 4 **(13 Hrs)**

Positive rays and photoelectric effect

4.1 Positve rays- Aston's mass spectrograph-Dempster's mass spectrograph.

4.2 Photoelectric effect: Introduction-photoelectric laws-laws of photoelectric effect-Einstein's photoelectric equation-experimental verification of Einstein's photoelectric equation-Millikan's experiment-photoelectric cells.

4.3 Production of X-rays-Bragg's law-Bragg's spectrometer-X-ray spectra-continuous and characteristic X-ray spectrum-Moseley's law-Compton effect-experimental verification

Unit 5 **(13 Hrs)**

Atom model

5.1. Excitation and ionization potentials-vector atom model-spatial quantization-spin quantum number associated with vector atom model- shell character-electronic structure-selection rules-electronic configuration-experimental confirmation of the vector atom model- Stern- Gerlach's experiment-Bohr magneton.

5.2. Zeeman effect-experimental arrangement of the normal Zeeman effect-expression for the Zeeman shift-Paschen Back effect-Stark effect.

BOOKS FOR STUDY

Arthur Beiser, Concepts of Modern Physics, Tata Mc Graw Hill Publishing Co., Ltd., New Delhi,(2004).

Mathur, D.S., Elements of Properties of Matter**,** Shyamlal Charitable Trust, New Delhi. (1993).

Murugesan.R, Properties of Matter**,** S.Chand and Company Ltd., New Delhi, (2005).

Murugesan.R, Modern Physics, S.Chand and Company Ltd., New Delhi, (2004).

BOOKS FOR REFERENCE

Halliday, David. Robert Resnick and Jearl Walker, Fundamentals of Physics, John Wiley and Sons, Inc., Replica Press Pvt. Ltd., Kundhi, (2001).

Rajam.J.B., Atomic Physics, S.Chand and Company Ltd., New Delhi,(2000).

Young Hugh D. Freedman Roger A, University Physics, Addison Wesley Longman,Inc., Pinnacle Book Pvt Ltd., New Delhi, (1998).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered) in 30 minutes
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5

Section B – 5 x 5 = 25 Marks (5 out of 7 to be answered (5 problems & 2 theory))

Section C – 3 x 15 = 45 Marks (3 out of 5 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

Allied Core Course Offered by the Department of Physics to students of Mathematics

SYLLABUS

(Effective from the academic year 2011 – 2012)

PHYSICS FOR MATHEMATICS-I

CODE:11PH/AC/PM13 **CREDITS: 3**

L T P: 3 0 0

TOTAL TEACHING HOURS: 39

OBJECTIVES

- To understand the basic concepts of Mechanics and Properties of Matter.
- To understand the basic concepts of Thermal Physics and Sound.

Unit 1

Mechanics (13 Hrs)

1.1 Dynamics: compound pendulum- theory- determination of 'g' with bar pendulum- bifilar pendulum- parallel threads and non- parallel threads.

1.2 Relativity: Newton's laws of motion and its limitations- inertial frames of reference – Newtonian Relativity – Galilean transformation equations – postulates of special theory of relativity- Lorentz transformation equations- length contraction- time dilation- experimental evidence- twin paradox and meson paradox- relativistic momentum (no derivation) – mass energy relation- physical significance- relativity of simultaneity.

Unit 2

Properties of matter (13 Hrs)

2.1 Elasticity: moduli of elasticity – expression for bending moment – depression at the loaded end of the cantilever – depression and elevation at the mid point of a loaded beam (non- uniform and uniform bending) – torsion in a wire – torque per unit twist – torsional oscillations – expression for period.

2.2 Surface tension: definition – angle of contact – variation of surface tension with temperature – determination of surface tension by drop weight method- interfacial surface tension.

2.3 Stream line flow and turbulent flow – critical velocity – Euler's equation of continuity of flow.

Unit 3

Thermal physics and sound (13 Hrs)

3.1 Thermodynamics – thermal equilibrium and zeroth law of thermodynamics – statement of first and second law of thermodynamics. Entropy: definition – change of entropy in reversible and irreversible process – increase of entropy of the universe – entropy and the unavailable energy – statement of the third law of thermodynamics.

3.2 Sound: Ultrasound: magnetostriction – piezo electric effect – reflection of ultrasonic waves – applications.

BOOKS FOR STUDY AND REFERENCE

Mathur , D.S. Heat and Thermodynamics, S. Chand and Sons, New Delhi (1989).

Murugeshan, R. Modern Physics, S. Chand and Sons, New Delhi (1994).

Murugeshan, R. Properties of Matter, S. Chand and Sons, New Delhi (1994).

Narayanamurthi, M. & N Nagarathnam, Dynamics, The National Publishing Co. Madras (1994).

Rajam, J.B. A Text Book of Heat and Thermodynamics, S. Chand and Sons, New Delhi (1983).

Resnick, Robert, Introduction to Special Relativity, Wiley Eastern, New Delhi (1989).

Subrahmanyam, N. & Brij Lal., A Text Book of Sound, Vikas Publishing House, New Delhi (1982).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered)
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5
Section B – 5 x 6 = 30 Marks (5 out of 7 to be answered (5 problems & 2 theory))
Section C – 2 x 20 = 40 Marks (2 out of 4 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

Allied Core Course Offered by the Department of Physics to students of Mathematics

SYLLABUS

(Effective from the academic year 2011 – 2012)

PHYSICS FOR MATHEMATICS - I PRACTICAL

CODE:11PH/AC/P111 **CREDITS:2**

L T P: 0 0 2*

TOTAL HOURS: 26

1. Compound Pendulum
2. Young's Modulus 'E' by non-uniform bending- pin and microscope
3. Young's Modulus 'E' by uniform bending-Scale and Telescope
4. Rigidity Modulus 'G' by torsional oscillations (moment of inertia to be assumed)
5. Surface Tension and Interfacial Surface tension – drop weight method.
6. Spectrometer – determination of the refractive index of the material of a prism
7. Post Office box – verification of laws and specific resistance
8. Zener diode characteristics – voltage regulation

* 1 practical session of 2 Hrs. duration per week .

BOOK FOR STUDY

Ouseph, C.C., Srinivasan, V., & Balakrishnan,R. (1992), **A Text Book of Practical Physics, Vol. I & II**., S. Viswanathan Pvt. Ltd. Madras.

PATTERN OF EVALUATION

Total Marks : 50 Duration : 3hrs

Formula & Procedure	20
Observation	20
Calculation & Result	10

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE : BRANCH – III – PHYSICS

SYLLABUS

(Effective from the academic year 2011 – 2012)

MECHANICS

CODE: 11PH/MC/ME24 **CREDITS:4**

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To understand the physical laws and concepts of static and dynamic bodies.
- To acquire basic knowledge about Lagrangian Mechanics.

Unit 1

Impulse and Impact (13 Hrs)

1.1 Laws of impact-impact between two smooth bodies- direct impact between two smooth spheres-oblique impact between two smooth spheres-Impact of a smooth sphere on a smooth fixed horizontal plane.

1.2 Motion on a plane curve: Centripetal and centrifugal force-hodograph-expression for normal acceleration by the hodograph method- conical pendulum.

Unit 2

Simple Harmonic motion (13 Hrs)

2.1 Periodic and harmonic motion- simple harmonic motion-energy of a harmonic oscillator- examples

2.2 Free, damped, forced vibrations and resonance- Fourier theorem- application to saw-tooth wave and square wave.

Unit 3

Rigid body dynamics (13 Hrs)

3.1 Moment of inertia of a uniform rod- rectangular lamina – uniform circular ring – uniform circular disc – solid sphere – spherical shell – hollow sphere – solid cylinder.

3.2 The compound pendulum- determination of ‘g’- centre of suspension and centre of oscillation- minimum periods of a compound pendulum-bifilar pendulum- parallel and non-parallel threads.

3.3 Gyroscopic precision- gyroscopic top- the spinning top.

Unit 4

Centre of gravity (13 Hrs)

4.1 Centre of gravity of a body- a system of particles in a straight line- compound body- remainder – solid and hollow hemisphere – solid tetrahedron -solid cone.

Unit 5

Lagrangian Mechanics (13Hrs)

5.1 Degrees of freedom – constraints – generalised co-ordinates and the transformation equations- illustrations- principle of virtual work and D' Alembert's principle.

5.2 Lagrange's equation – application- simple pendulum – Atwood's machine.

BOOKS FOR STUDY AND REFERENCE

Goldstein Herbert, Second Edition, Classical Mechanics, Addison & Wesely Inc.,Mass,U.S.A (1980).

Halliday, David and Robert, Resnick, Physics Vol.I, New Age Int. Ltd., Chennai(1995).

Halliday, David Robert Resnick and Walker Jearl, Fundamentals of Physics, John Wiley & Sons, Inc (2001).

Mathur,D.S., Mechanics, S. Chand and Co., Ltd. Ne.w Delhi (1994).

Narayanamurthi, M. & Nagarathnam, N. Dynamics, The National Publishing Co. Madras (1994).

Narayanamurthi, M. & Nagarathnam, N. Statics, Hydrostatics and Hydrodynamics, The National Publishing Co. Madras (1982).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered) in 30 minutes
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5
Section B – 5 x 5 = 25 Marks (5 out of 7 to be answered (5 problems & 2 theory))
Section C – 3 x 15 = 45 Marks (3 out of 5 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. PHYSICS : BRANCH III – PHYSICS

SYLLABUS
(Effective from the Academic year 2011-2012)

EXPERIMENTAL PHYSICS – II

CODE:11PH/MC/P222 **CREDITS : 2**
L T P : 0 0 3*
TOTAL HOURS : 39

OBJECTIVE

- To expose students to the technique of handling the measuring instruments.

1. Bifilar Pendulum
2. Rigidity Modulus 'G' by Static Torsion
3. Surface Tension of a liquid by capillary rise method.
4. Absolute determination and comparison of coefficient of viscosities of liquids.
5. Sonometer – Verification of laws and determination of frequency of tuning fork..
6. Potentiometer – Ammeter calibration (high range and low range).
7. B. G figure of merit- current and voltage sensitivity.
8. Spectrometer – grating – normal incidence (i) standardization of the grating (N) (ii) determination of the wavelength of the prominent lines of the mercury spectrum. (iii) dispersive power of the grating.
9. Computer simulated experiment.

* At least 8 experiments to be selected by the course teacher.
* 1 practical session of 3 hours duration per week .

BOOK FOR STUDY

Ouseph,C. C., V. Srinivasan and R. Balakrishnan, **,** A Text Book of Practical Physics, Vol. I & II., S.Viswanathan Pvt., Ltd. Madras(1992**)**.

PATTERN OF EVALUATION

Total Marks : 50 Duration : 3 hrs

Formula & Procedure	20
Observation	20
Calculation & Result	10

STELLA MARIS COLLEGE (AUTONOMOUS), CHENAI-600 086

B.Sc. DEGREE: BRANCH III – PHYSICS

SYLLABUS

(Effective from the academic year 2011 – 2012)

THERMAL PHYSICS AND STATISTICAL MECHANICS

CODE:11PH/MC/TS24 **CREDITS: 4**

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To understand the concepts of heat and temperature
- To appreciate thermo dynamical applications

Unit 1 **(13Hrs)**

Transport Phenomena and Radiation

1.1 Transport phenomena-mean free path-expression for mean free path - expression for coefficient of viscosity of gases- thermal conductivity of gases- diffusion - relationship between transport coefficients.

1.2 Blackbody radiation-distribution of energy in the spectrum of a black body-experimental arrangement to study energy distribution in black body spectrum experimental results-statements of Stefan-Boltzmann and Wiens' displacement law-quantum theory of radiation

1.3 Average energy of Planck's oscillator-Planck's hypothesis-Planck's radiation Relation-Stefan-Boltzmann law from Planck's radiation relation –Wien's and Rayleigh-Jeans law from Planck's' radiation relation.

Unit 2 **(12Hrs)**

Thermodynamics

2.1 Thermodynamic systems-thermal equilibrium and concept of temperature-zeroth law of thermodynamics –thermodynamic processes- internal energy-

2.2 First law of thermodynamics (Statement)-isothermal and adiabatic elasticity of a gas - second law of thermodynamics-statements of Clausius and Kelvin-principle of a heat engine

2.3 Thermodynamics of refrigeration-coefficient of performance- Thermo dynamic potentials (definition)

Unit 3 **(12Hrs)**

Entropy

3.1 Entropy- definition-entropy change in reversible and irreversible processes-entropy and unavailable energy-entropy of a perfect gas-temperature –entropy diagram - technical importance of T-S diagram - law of increase of entropy-entropy and disorder

3.2 Second law of thermodynamics in terms of entropy- expression connecting first and second laws of thermodynamics - statement of third law of thermodynamics

Unit 4 (14Hrs)

Maxwell's thermo dynamical relations and Low Temperature Physics

4.1 Maxwell's thermo dynamical relations-deduction from thermo dynamical relations 1) first and second Tds equations 2) Variation of intrinsic energy with volume-3) $C_p - C_v = R$ 4) Clausius –Clapeyron latent heat equation

4.2 Liquefaction of gases-liquefaction of Helium- peculiar properties of liquid Helium II

4.3 Production of very low temperature-adiabatic demagnetization of para magnetic salt-theory and experiment

Unit 5 (14Hrs)

Maxwellian Distribution and Statistical Physics

5.1 Maxwell law of velocity distribution-root mean square velocity- average and most probable velocities –experimental verification

5.2 Definition of phase space-micro and macro states- ensembles-definition of thermodynamic probability-relation between entropy and probability

5.3 Classical Statistics- Maxwell-Boltzmann statistics -quantum **s**tatistics-Bose -Einstein statistics -Fermi-Dirac statistics

BOOKS FOR STUDY

Kakani,S.L, Heat, Thermodynamics and Statictical Mechanics**,** Sultan Chand & sons, New Delhi,(1989) .

Mathur.D.S., Heat and Thermodynamics **,** Sultan Chand & sons, New Delhi, (2004).

Rajam,J.B., Heat and Thermodynamics**,** S.Chand & Co, New Delhi, (1981).

BOOKS FOR REFERENCE

Bhatia,V.S., Thermodynamics and Kinetic Theory**,** Shobanlal Nagin Chand & Co, New Delhi, (1993).

Das Gupta ,A.K, 1st edition, Fundamentals of Statistical Mechanics**,** New central Book agency (P) Ltd., Calcutta **,** (1994)

Gupta and Kumar,Elementary Statistical Mechanics **,**Pragati Prakasham, Meerut,(1993).

Sears and Zemansky, Heat and Thermodynamics, McGraw Hill Kogakusha Ltd.,Tokyo, (1968).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered) in 30 minutes
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5

Section B – 5 x 5 = 25 Marks (5 out of 7 to be answered (5 problems & 2 theory))

Section C – 3 x 15 = 45 Marks (3 out of 5 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

Allied Core Course Offered by the Department of Physics to the students of Mathematics

SYLLABUS

(Effective from the academic year 2011 – 2012)

PHYSICS FOR MATHEMATICS - II PRACTICAL

CODE: 11PH/AC/P221 **CREDITS:2**

L T P: 0 0 2*

TOTAL HOURS: 26

9. Rigidity Modulus 'G' by Static Torsion
10. Newton's rings – Determination of Radius of curvature of a lens
11. Spectrometer – grating – standardization of the grating (N)- determination of wavelengths (λ)
12. Joule's coil – determination of specific heat of a liquid – half time correction
13. Potentiometer – ammeter calibration (low range)
14. Field along the axis of a coil carrying current – determination of B_H
15. Transistor characteristics – CE mode
16. Construction of AND and OR gates using junction diodes and NOT gate using transistor, AND ,OR & NOT using IC's

* 1 practical session of 2 Hrs. duration per week.

BOOK FOR STUDY

Ouseph, C.C., Srinivasan, V., & Balakrishnan,R. (1992), **A Text Book of Practical Physics, Vol. I & II**., S. Viswanathan Pvt. Ltd. Madras.

PATTERN OF EVALUATION

Total Marks : 50 Duration : 3hrs

Formula & Procedure	20
Observation	20
Calculation & Result	10

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

Allied Core Course Offered by the Department of Physics to students of Mathematics

SYLLABUS

(Effective from the academic year 2011 – 2012)

PHYSICS FOR MATHEMATICS-II

CODE:11PH/AC/PM23 **CREDITS: 3**

L T P: 3 0 0

TOTAL TEACHING HOURS: 39

OBJECTIVES

- To understand the basic concepts of Electricity and Magnetism.
- To understand the basic concepts of Optics and Electronics.

Unit 1 **(13 Hrs)**

Electricity & Magnetism

1.1 Quantisation of charge – conservation of electric charge – Coulomb's law of force between charges – flux of electric field – Gauss's law – statement and proof – E- for a point charge using Gauss law – electric potential – relation between potential and field strength – Capacitance- capacitance of parallel plate capacitor with and without dielectric – dielectric and atomic view – dielectric and Gauss's law – three electric vectors E, P, D and current density J.

1.2 Magnetic Field: Definition of B – force on a charge in a magnetic field, in an electromagnetic field (Lorentz Force) – Maxwell's electromagnetic equations (no derivations) – physical significance of the equations.

1.3 Electromagnetism: force on a current carrying conductor in a magneticfield – moving coil ballistic galvanometer – theory, current and charge sensitivity of B.G – relation between the two.

Unit 2

Optics **(13 Hrs)**

2.1 Defects of images- monochromatic aberrations – spherical aberrations in lenses – methods of minimizing spherical aberration- chromatic aberration – achromatic combination of lenses in contact and lenses separated by a distance.

2.2 Optical instruments: telescopes – angular magnification of telescopes – refractive astronomical telescope – terrestrial telescope – reflecting telescopes – Gregory's telescope, Newton's telescope, Herschel's telescope and Cassegrain's telescope – Radio telescope – Hubble telescope.

2.3 Interference: Newton's rings – measurement of wavelength.

2.4 Diffraction: introduction – Fraunhofer diffraction – transmission grating – normal incidence – determination of wavelength.

2.5 Polarisation – double refraction – nicol prism – optical activity – determination of specific rotatory power using Laurent's half shade polarimeter – uses of polaroids.

2.6 Types of spectra – emission and absorption spectra – solar spectrum – Fraunhofer's lines electromagnetic spectrum.

Unit 3

Electronics (13 Hrs)

3.1 Operational amplifier – ideal op- amp - CMRR – inverting and non-inverting op- amp - summing, difference, integral and differential op-amp.

3.2 Digital electronics: number system – decimal to binary conversion – binary addition- subtraction – multiplication – division

3.3 OR – AND – NOT – gates – construction of OR – AND – NOT gates using diodes and transistors- Boolean algebra- De Morgan's theorem – verification.

BOOKS FOR STUDY AND REFERENCE

Haliday, David and Robert Resnick, Physics Vol. II, New Age Int. Ltd., Chennai (1995).

Kakani, S L, & Bhandari K C, A Text Book of Optics, Sultan Chand & Sons, Educational Publishers New Delhi ,(2002).

Mahajan, A.S.,& Rangwala, A.A., Electricity and Magnetism, Tata McGraw Hill Publishing Co., Ltd. New Delhi (1993).

Mehta, V.K., Principles of Electronics, S. Chand and Co., Ltd. New Delhi (1991).

Subrahmanyam, N. & Lal Brij., A Text Book of Optics, S Chand and Co., Ltd. New Delhi (1987).

Subrahmanyam, N. & Lal Brij., A Text Book of Electricity and Magnetism, Ratan Prakash Mandir, Agra (1994).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered)
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5
Section B – 5 x 6 = 30 Marks (5 out of 7 to be answered (5 problems & 2 theory))
Section C – 2 x 20 = 40 Marks (2 out of 4 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086

B.Sc. DEGREE: BRANCH III – PHYSICS

SYLLABUS

(Effective from the academic year 2011 -2012)

PHYSICS FOR CHEMISTRY –II

CODE : 11PH/AC/PC23 **CREDITS : 3**

L T P : 3 0 0

TOTAL TEACHING HOURS : 39

OBJECTIVES

- To understand the basic concepts of Electricity and Magnetism.
- To appreciate the developments in Modern Physics and Electronics.

Unit 1 **(8 Hrs)**

Electricity

1.1 Coulomb's law of inverse squares – electric field definition – flux of electric field – Gauss's law – application of Gauss's law to determine

i) field due to a point charge
ii) field due to a spherical charge distribution
iii) field due to infinite line charge distribution
iv) field due to a cylindrical charge distribution

1.2 Conservative nature of electrostatic field – electric field – electric potential – potential at a point due to point charge- relation between potential and field strength

1.3 Capacitance : principle- capacitance of a parallel plate capacitor with and without dielectric

Unit 2 **(8 Hrs)**

Magnetism

2.1 Magnetic field : definition of B – force on a charge in a magnetic field – force on a charge in an electro magnetic field(Lorentz force) – Maxwell's electromagnetic equations (no derivations) – physical significance of the equations.

2.2 Magnetic properties of materials: relation between relative permeability and susceptibility- hysterisis- magnetometer method of drawing hysterisis curve- energy laws – retentivity- coercivity – uses of hysterisis curves

2.3 Electromagnetism : force on a current carrying conductor in a magnetic field – moving coil ballistic galvanometer – figure of merit of ballistic galvanometer for charge and current sensitivity

Unit 3 **(10 Hrs)**

Modern Physics

2.1 MASER : description and working of Ammonia MASER

2.2 LASER : LASER action – population inversion – Carbon dioxide LASER – applications

2.3 Holography : principles – preparation of holograms applications

2.4 Fibre Optics : principles – characteristics – classification – applications

Unit 4 **(13 Hrs)**

Electronics

3.1 Operational amplifier – ideal op- amp - CMRR – inverting and non-inverting op- amp - summing, difference, integral and differential op-amp.

3.2 Digital electronics : number system – decimal to binary conversion – binary addition- subtraction – multiplication – division

3.2 OR – AND – NOT – gates – construction of OR – AND – NOT gates using diodes and transistors- Boolean algebra- De Morgan's theorem – verification.

BOOKS FOR STUDY AND REFERENCE

Haliday, David and Robert Resnick, (1995), **Physics Vol. II,** New Age Int. Ltd., Chennai.

Kakani, S L, & Bhandari K C,(2002), **A Text Book of Optics,** Sultan Chand & Sons, Educational Publishers New Delhi.

Laud .B.B (1991) **Lasers and non – Linear Optics,** Wiley Eastern New Delhi

Mahajan, A.S.,& Rangwala, A.A., (1993), **Electricity and Magnetism**, Tata McGraw Hill Publishing Co., Ltd. New Delhi.

Mehta, V.K., (1991), **Principles of Electronics**, S. Chand and Co., Ltd. New Delhi.

Murugeshan.R (1992), **Modern Physics**, S. Chand and Company Pvt. Ltd., New Delhi

Subrahmanyam, N. & Lal Brij., (1994), **A Text Book of Electricity and Magnetism,** Ratan Prakash Mandir, Agra.

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE : BRANCH – III – PHYSICS

SYLLABUS
(Effective from the academic year 2011 – 2012)

GEOPHYSICS
(Independent Elective)

CODE: 11PH/UI/GP23 **CREDITS: 4**

OBJECTIVES

- To learn the basics of Geophysics
- To learn and appreciate the dynamics of earth.

Unit1: The Earth as a planet (7hrs)

1.1 Solar system, Kepler's law of planetary motion, Bode's law
1.2 Characteristics of Planet, Origin of the Solar System, Earth's structure.

Unit 2: **Gravity and the figure of the Earth (10hrs)**

2.1 Earth size and shape, Gravitation- law of universal gravitation,gravitational acceleration, gravitational potential
2.2 Earth's rotation, Earth's rotation, Earth's figure and gravity.

Unit 3: Seismology and Seismic waves (10hrs)

3.1 Elastic theory- Elastic, An elastic and plastic behavior of materials; Elastic waves- Body waves, surface waves
3.2 Seismograph- Introduction, various seismometers; Seismic wave propagation- Introduction, Huygens's principle, Diffraction, Fermat's principle.

Unit 4: **Geomagnetism (13hrs)**

4.1 Introduction- Discovery of magnetism, Magnetic properties of material- Diamagnetic, Paramagnetic, Ferromagnetic- Curie Temperature.
4.2 Magnetometers- Flux gate magnetometer, Proton precession magnetometer.

Unit 5: **Petroleum Geology (13hrs)**

5.1 Introduction (origin and theory of hydrocarbons), Source rock, Migration, Reservoir rock, Classification of reservoir rocks, Physical characteristic of reservoir rock (depth, area and thickness, porosity, permeability); Cap rocks,
5.2 Traps- Types of Traps (Structural traps, Salt Dome traps, Stratigraphic traps, combinational traps).

BOOKS FOR STUDY

- Baker Hugher INTEQ Petroleum GeologyBaker Hughes INTEQ **(**1999)
- Robert.J.Lilie, Whole Earth Geophysics by Prentice Hall,Inc Upper Saddle River, New Jersey 07458**(**1999)
- William Lowrie, Fundamentals of Geophysics Cambridge University Press 1997

BOOKS FOR REFERENCES

- Rolf Meissner, The Little Book of Planet Earth
- Don.L.Anderson, Theory of the Earth**,** Blackwell Scientific publications (1989)

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 10 x 3 = 30 Marks (All questions to be answered).
Section B – 6 x 5 = 30 Marks (6 out of 8 to be answered
Section C – 2 x 20 = 40 Marks (2 out of 4 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENAI-600 086

B.Sc. DEGREE: BRANCH III – PHYSICS

SYLLABUS

(Effective from the academic year 2011 – 2012)

TECHNIQUES OF PHOTOGRAPHY
(Independent Elective)

CODE: 11PH/IE/TP23 **CREDITS: 4**

OBJECTIVES

- To learn the basics of photography
- To learn and experiment different types of camera operations
- To have basic knowledge of digital photography

Unit 1

Camera components

1.1 Pin hole images-comparison between human eye and camera-focal length- image size-angle of view-depth of field-depth of focus.

1.2 Basic camera components - viewing and focusing systems- view finder-range finder- single and twin lens reflex.

1.3 Lens - wide angle lenses-telephoto lenses-zoom lenses-mirror lens. aperture-shutters-types of shutters-leaf shutter-focal plane shutter-types of cameras-SLR and TLR.

Unit 2

Lighting effect and filters

2.1 Lighting - front lighting-half-side (45º) lighting-side lighting-backlighting-indoor lighting-available light-artificial light-using flash-bounce flash-fill in flash.

2.2 Exposure - qualities of natural light-soft/hard light. sun and weather-f-number scales f-numbers and exposure time.

2.3 Filters – how filters work-filters for correction-filters for contrast-special purpose color filters-viewing filters-graduated sky filters.-haze filters-color separation filters.

Unit 3

Digital photography

3.1 Introduction – Digital cameras – camera basics – Scanners – Sensors .

3.2 Image creation – electronic sequencing – quantization – factors affecting exposure – colour mixing -sampling – Types of digital images .

3.3 Files - Bit depth - - File size – bit order – compression – File types – RAW- TIFF-PSD-JPEG- GIF- EPS- PDF

Unit 4

Printing

4.1 Printing - enlarger-condenser enlarger-diffusion enlarger-printing papers-chemicals for print processing-the printing process-making a photogram-making a contact sheet-printing from negatives.

4.2 Special printing controls: burning-in procedure-dodging procedure-digital manipulation.

Unit 5

Hybrid digital photography

5.1 Introduction – sensor size versus films – colour interpolation versus scanned colour- Spectral sensitivity .

5.2 Electronics – storage- Hybrid digital imaging – Dynamic range –workflow comparison .

Practicals

1. Handling and using Camera.
2. Identification of raw materials and cameras.
3. Preparation of chemicals for film development and printing.
4. Photogram.
5. Developing black and white negative.
6. Printing and enlarging black and white positive
7. Digital Color photography-printing.
8. Photo editing using Adobe-Photoshop.

BOOKS FOR STUDY

George T.Carver. & Eugene E.Lee., Beginning Photography, Prentice Hall.Inc., Englewood Cliffs, New Jersey(1985).

Jacqueline Dineen, Young Photographer's Pocket Book, Purnell Books, Paulton, Bristol(1984).

Langford Michael J, Basic Photography, The Focal Press London and New York(1971).

Langford Michael J, SLR Handbook, Dorling Kindersly Limited, London(1980).

Busch David D, Digital Photography, Prentice Hall, New Jersey(2005).

Glenn Rand, David Litschet, Robert Davis – Digital photographic capture -2005 , focal press publication – Oxford

BOOKS FOR REFERENCE

Gordon Roberts, Mastering Photography, Macmillan Press Ltd(1995).

Robert Shufflebotham, Photoshop 7 in easy steps**,** Dreamtech, New Delhi.
books for study (2005)

Jerry Glenwright –Digital Photography click- by-click by friedman/ Fairfax Publishers (2002)

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 10 x 3 = 30 Marks (All questions to be answered).
Section B – 6 x 5 = 30 Marks (6 out of 8 to be answered
Section C – 2 x 20 = 40 Marks (2 out of 4 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

General Elective Course Offered by Department of Physics to

B A. / B.Sc. / B.Com. / B.C.A. / B.S.W. / B.V.A. Degree Programmes

SYLLABUS

(Effective from the academic year 2011 – 2012)

BASICS OF PHOTOGRAPHY

CODE: 11PH/GE/BP32 **CREDITS: 2**

L T P: 1 0 1

TOTAL TEACHING HOURS: 26

OBJECTIVES

- To learn the basics of photography
- To learn and experiment with different types of camera operations
- To have basic knowledge of digital photography

Unit 1 **(8 Hrs)**

Camera components and lighting

1.1 Basic camera components- comparison between human eye and camera-viewing and focusing systems- view finder-range finder- single and twin lens reflex-types of cameras.

1.2 Lens: wide angle lenses-telephoto lenses-zoom lenses-mirror lens. shutters-types of shutters-leaf shutter-focal plane shutter- aperture- f-number scales f-numbers and exposure time.

Unit 2 **(8 Hrs)**

Printing and digital photography

2.1 Filters – how filters work-filters for correction-filters for contrast-special purpose colors filters-viewing filters-graduated sky filters.-haze filters-color separation filters.

2.2. Developing the film-enlarger-printing papers-the printing process-making a photogram-printing from negatives.

2.3 Digital camera systems: Charge Coupled Device(CCD)-card reader-modes of transferring technique-color mixing-resolution-color saturation

Unit 3 **(10 Hrs)**

Practicals

1. Handling and using camera.
2. Identification of raw materials and cameras.
3. Preparation of chemicals for film development and printing.
4. Photogram.
5. Developing black and white negative.
6. Printing and enlarging black and white positive

7. Digital
8. Color photography-printing.
9. Photo editing using Adobe-Photoshop.

BOOKS FOR STUDY

George T.Carver. & Eugene E.Lee, Beginning Photography, PrenticeHall.Inc.Englewood Cliffs. New Jersey 07632.(1985)

Jacqueline Dineen, Young Photographer's Pocket Book, Purnell Books, Paulton, Bristol BS185LQ. (1984)

BOOKS FOR REFERENCE

Busch David D, Digital Photography, Prentice Hall, New Jersey(2005)

Gordon Roberts, , Mastering Photography, Macmillan Press Ltd. (1995)

Langford Michael J., Basic Photography, The Focal Press London and New York. (1971)

Langford Michael J., SLR Handbook, Dorling Kindersly limited, London(1980).

Robert Shufflebotham, Photoshop 7 in easy steps**,** Dreamtech, New Delhi(2005).

PATTERN OF EVALUATION (Totally Internal)

CONTINUOUS ASSESSMENT (CA): One Hour Test – 25 Marks
One Component – 25 Marks

This is will be converted to 100 Marks by Controller of Examination

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086

General Elective Course Offered by Department of Physics to

B A. / B.Sc. / B.Com. / B.C.A. / B.S.W. / B.V.A. Degree Programmes

SYLLABUS

(Effective from the academic year 2011-2012)

DIGITAL ELECTRONICS

CODE:11PH/GE/DE32 **CREDITS: 2**

L T P: 1 0 1

TOTAL TEACHING HOURS: 26

- *Not Offered to students of Physics, Mathematics and Chemistry*

OBJECTIVES

- To understand the concept of digital principles as applied to microprocessors and computers.
- To develop knowledge in combinational logic and sequential logic and their applications.

Unit 1 **(8 Hrs)**

Number system

1.1 Digital electronics : number system – decimal to binary conversion – binary to decimal conversion - binary addition- subtraction – multiplication – division

1.2 OR – AND – NOT – gates – construction of OR – AND – NOT gates using diodes and transistors.

Unit 2 **(10 Hrs)**

Digital arithmetic circuits

2.1 Universal gates – NAND , NOR building blocks – AND law – OR law commutative law – associative law – distributive law .

2.2 Boolean algebra - De Morgan's theorem – algebraic simplification – implementation of Boolean algebra into circuits.

Unit 3 **(8 Hrs)**

Integrated circuits – Fabrication and Characteristics

3.1 Integrated circuit technology - basic monolithic Integrated circuits – epitaxial growth – masking and etching -diffusion of impurities.

3.2 Transistors for monolithic circuits – monolithic diodes – integrated resistors- and capacitors

BOOKS FOR STUDY

Albert Paul Malvino, Electronic Principles**,** Tata McGraw Hill Pub. Co. Ltd., New Delhi. (1984)

Albert Paul Malvino and Leach Donald, Digital Principles and Applications, Tata McGraw Hill Pub. Co. Ltd., New Delhi. (1981)

Mehta V.K, Electronic Principles, S. Chand and Company, New Delhi(2005).

BOOKS FOR REFRENCE

Allen Mottershead, Electronic Devices and Circuits, Prentice Hall of India Pvt. Ltd., New Delhi. (1982)

Ambrose A & T Vincent Devaraj, Elements of Solid State Electronics, Meera Publications K.K. Dist. (1990)

Floyd Thomas L., Digital Fundamentals , Universal Book Stall, New Delhi(1997)

Milmann and Halkias, Integrated Electronics, Tata McGraw Hill Pub. Co. Ltd., New Delhi. (1992)

Sedha R.S Applied Electronics, S Chand and Company, New Delhi. (1997)

PATTERN OF EVALUATION (Totally Internal)

CONTINUOUS ASSESSMENT (CA): One Hour Test – 25 Marks
One Component – 25 Marks

This is will be converted to 100 Marks by Controller of Examination

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI-600 086

B.Sc. DEGREE: BRANCH III – PHYSICS

SYLLABUS

(Effective from the year 2011-2012**)**

MATHEMATICAL PHYSICS

CODE:11PH/MC/MP34 **CREDITS: 4**

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES: To enable students

- to study the various mathematical techniques
- to apply these techniques to physical problems
- to appreciate the close connection of mathematics with physics.

Unit 1 **(13 Hrs)**

Vector Calculus

1.1 Dot and cross products-application to mechanics-work done- moment of a force-angular velocity.

1.2 Vector differentiation: ordinary derivatives of vectors – space curves – continuity and differentiability – partial derivative of vectors.

1.3 The vector differential operator del – the gradient – the divergence – the curl

Unit 2 **(13 Hrs)**

Vector Calculus

2.1 Vector integration: Ordinary integrals of vectors – line integrals – surface integrals – volume integrals.

2.2 The divergence theorem of Gauss – statement and proof-deductions from Gauss Theorem-(i)Gauss law in differential form, (ii)Poisson's equation and Laplace's equation.

2.3 Stoke's theorem-statement and proof.

2.4 Green's theorem-statement and proof.

Unit 3 **(13 Hrs)**

First Order Differential equations

3.1 Notation – solution – initial and boundary value problems – classification of first order differential equations – standard form, differential form – linear equations – Bernoulli's equation – homogenous equations, separable equations – exact equations and their solutions.

3.2 Linear first order differential equations: Malthus' model – applications of first order differential equations to

(i) Growth and decay – radio active decay – compound interest – population growth.

(ii) Temperature problems

(iii) Falling body problems

(iv) Electrical circuits (RL and RC)

Unit 4 **(13 Hrs)**

Second order Differential equations

4.1. Second order differential equations with constant coefficients: the characteristic equation – general solutions.

4.2. Applications of second order differential equations to

(i) Spring problem

(ii) Electrical circuit problems.

Unit 5 **(13 Hrs)**

Special functions

5.1 Gamma functions: definition – fundamental properties of gamma function – value of $\Gamma(1/2)$ – graph of gamma functions – transformation of gamma functions.

5.2 Beta functions: different forms of beta functions – relation between beta and gamma functions.

5.3 Legendre's differential equation and Legendre functions – series solution of Legendre differential equations – Rodrigue's formula for Legendre polynomials – Explicit expressions for Legendre polynomials using Rodrigue's formula – graphical representation of Legendre polynomials.

BOOKS FOR STUDY

Bronson Richard, Schaum's Outline of Theory and problems of Differential Equations, Mc Graw Hill Company, New Delhi(1994).

Murray R.Spiegel, Schaum's Outline of Theory and problems of Vector Analysis**,** Mc Graw Hill Company, New Delhi(1974).

BOOKS FOR REFERENCE

Dass M.K., Mathematical physics , S.Chand & company Ltd, Ram Nagar, New Delhi(2001).

Gupta B.D., Mathematical physics, Vikas Publishing House Pvt. Ltd., New Delhi (1992).

Prakash Satya, Mathematical Physics with Classical Mechanics, Sultan Chand & Sons, New Delhi(2004).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered) in 30 minutes
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5

Section B – 5 x 5 = 25 Marks (5 out of 7 to be answered (5 problems & 2 theory))

Section C – 3 x 15 = 45 Marks (3 out of 5 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. PHYSICS : BRANCH III – PHYSICS

SYLLABUS
(Effective from the Academic year 2011-2012)

EXPERIMENTAL PHYSICS – III

CODE: 11PH/MC/P332 **CREDITS : 2**
L T P : 0 0 3*
TOTAL HOURS : 39

OBJECTIVE

- To expose students to the technique of handling the measuring instruments.

1. Newton's Law of cooling – (i) verification (ii) determination of specific heat capacity of a liquid (iii) determination of emissivity of the surface.
2. Melde's apparatus – determination of the frequency of the tuning fork using – transverse and longitudinal mode of vibrations of the string.
3. Newton's rings – determination of μ.
4. Multimeter Principle – conversion of milliammeter to (i) an ohmmeter (ii) a low range voltmeter (iii) conversion of a milliammeter of low range to a milliammeter of high range
5. Potentiometer – determination of resistance and specific resistance
6. Ballistic Galvanometer – figure of merit of charge sensitivity.
7. Latent heat of fusion of ice - Barton's correction.
8. Field along the axis of the coil carrying current - Determination of M and m.
9. Spectrometer - dispersive power of the prism and Cauchy's constants
10. Computer simulated experiment.

* Atleast 9 experiments to be selected by the course teacher.
* 1 Practical session of 3 hours duration per week.

BOOK FOR STUDY

Ouseph,C. C., V. Srinivasan and R. Balakrishnan, **,** A Text Book of Practical Physics, Vol. I & II., S.Viswanathan Pvt., Ltd. Madras(1992**)**.

PATTERN OF EVALUATION

Total Marks : 50 Duration : 3 hrs

Formula & Procedure	20
Observation	20
Calculation & Result	10

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

Allied Core Course Offered by the Department of Physics to the students of Chemistry

SYLLABUS

(Effective from the academic year 2011 – 2012)

PHYSICS FOR CHEMISTRY –I PRACTICAL

CODE:11PH/AC/P131 **CREDITS:2**

L T P: 0 0 2*

TOTAL HOURS: 26

1. Compound Pendulum
2. Young's Modulus 'E' by non-uniform bending- pin and microscope
3. Young's Modulus 'E' by uniform bending-Scale and Telescope
4. Rigidity Modulus 'G' by torsional oscillations (moment of inertia to be assumed)
5. Surface Tension and Interfacial Surface tension – drop weight method.
6. Spectrometer – determination of the refractive index of the material of a prism
7. Post Office box – verification of laws and specific resistance
8. Zener diode characteristics – voltage regulation

* 1 practical session of 2 Hrs. duration per week .

BOOK FOR STUDY

Ouseph, C.C., Srinivasan, V., & Balakrishnan,R. (1992), **A Text Book of Practical Physics, Vol. I & II**., S. Viswanathan Pvt. Ltd. Madras.

PATTERN OF EVALUATION

Total Marks : 50 Duration : 3hrs

Formula & Procedure	20
Observation	20
Calculation & Result	10

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
Allied Core Course Offered by the Department of Physics
to students of Chemistry

SYLLABUS

(Effective from academic year 2011-2012)

PHYSICS FOR CHEMISTRY –I

CODE:11PH/AC/PC33 **CREDITS : 3**
LTP : 3 0 0
TOTAL TEACHING HOURS : 39

OBJECTIVE

- To provide a basic knowledge of physical laws and principles

Unit 1 **(13Hrs)**

Dynamics and Relativity

1.1 Dynamics: moment of inertia- definition — compound pendulum – expression for the period of oscillation-centre of suspension and centre of oscillation–minimum period of oscillation of a compound pendulum-determination of 'g'

1.2 Relativity: - inertial frames of reference-special theory of relativity— postulates of special theory of relativity-Lorentz transformation equations-length contraction-time dilation – experimental evidence – twin paradox – relativistic momentum (no derivation) – mass energy relation – physical significance.

Unit 2 **(13 Hrs)**

Properties of Matter

2.1 Elasticity: modulli of elasticity – Poisson's ratio- Young's modulus – bending of beams - expression for bending moment-depression at the loaded end of the cantilever-depression and elevation at the mid point of a loaded beam- torsion in a wire – torsional oscillations – torque per unit twist-expression for period.

2.2 Surface tension – introduction - experimental determination of surface tension and interfacial surface tension by drop weight method –variation of surface tension with temperature.

2.3 Streamline and turbulent flow – critical velocity – Euler's equation of continuity of flow.

Unit 3 **(13 Hrs)**

Optics

3.1 Interference: introduction - interference due to reflected light – Newton's rings – measurements of wavelength.

3.2 Diffraction: introduction-Fraunhoffer diffraction- transmission grating-normal incidence – determination of wavelength.

3.3 Polarisation: introduction-plane of polarization-polarisation by refraction-Brewster's law-polarisation by reflection-Double refraction – nicol prism – nicol prism as a polarizer and analyser – polaroids-uses of polaroids.

BOOKS FOR STUDY

Murugeshan.R Properties of Matter., S. Chand and Company Pvt. Ltd., New Delhi,(1994).

Naranyanamurthi.M and Nagaratham.N, Dynamics, The National Publishing Co., Madras,(1994).

Naranyanamurthi.M and Nagaratham.N Statics, The National Publishing Co., Madras , (1994).

Resnick Robert, Introduction to Special Relativity, Wiley Eastern New Delhi,(1989).

Subrahmanyan. Nand Lal Brij, Textbook of Optics,Vikas Publishing House New Delhi,(1982).

BOOK FOR REFERENCE:

Halliday,David and Robert Resnick, ,Physics Vol I and II, New Age International Ltd., Madras, (1995).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered)
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5
Section B – 5 x 6 = 30 Marks (5 out of 7 to be answered (5 problems & 2 theory))
Section C – 2 x 20 = 40 Marks (2 out of 4 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086
General Elective Course Offered by Department of Physics to
B A. / B.Sc. / B.Com. / B.C.A. / B.S.W. / B.V.A. Degree Programmes
SYLLABUS
(Effective from the academic year 2011 – 2012)

ASTROPHYSICS

CODE:11PH/GE/AP44 **CREDITS: 4**
L T P: 4 0 0
TOTAL TEACHING HOURS: 52

OBJECTIVES

- To learn about stars and constellations
- To appreciate the universe.

Unit 1 **(11 Hrs)**

Our place in the Universe and Solar system

1.1 Introduction : our place in the universe-the sky- the constellation- annual motion of the sun-wanderers-time and the calendar.

1.2. The solar system: introduction-asteroids-meteoroids-meteors-comets-solar flares-Maunder minimum-solar-terrestrial relations.

Unit 2 **(10 Hrs)**

Stars-Introduction

2.1 Stars: description-stellar distances -absolute magnitude

2.2 Stellar spectra-the Hertzsprung Russell diagram.

2.3 Stellar sizes-binary stars-eclipsing binaries-common stars.

Unit 3 **(11 Hrs)**

Life history of stars

3.1 Life history of stars: the internal structure of a star.

3.2 stellar evolution- supernovae, pulsars, black holes- Chandrasekhar's limit and neutron stars.

Unit 4 **(10 Hrs)**

Our Galaxy

4.1 Our galaxy: star clusters-interstellar matter.

4.2 The galaxy-stellar population-the centre of the galaxy.

Unit 5 **(10 Hrs)**

The Universe

5.1 The universe-galaxies-the distance scale-the expanding universe

5.2 Radio galaxies- cosmology.

(Teaching techniques include, guest lectures, slide and film shows, seminar presentation, night observation, visit to planetarium and observations)

BOOK FOR STUDY

Abhyankar, , Astrophysics-Stars and Galaxies, University Press, Hyderabad. (2001)

BOOKS FOR REFERENCE

Baidayanath Basu, An Introduction to Astrophysics, Prentice Hall of India Pvt. Ltd., New Delhi.(1997)

Bhatia V.B., Astronomy and Astrophysics with Elements of Cosmology**,** Narosa Publishing House, New Delhi. (2001)

Kumaravelu and Susheela Kumaravelu, Astronomy, Diocesan Press, Nagercoil. (1981)

Owen Gingerrich, New Frontiers in Astronomy, W.H.Freeman and Company, San Fransisco. (1970)

END SEMESTER EXAMINATION:

Total Marks: 50 Duration: 2 Hours

QUESTION PAPER PATTERN

Section A – 10 x 2 = 20 Marks (All questions to be answered)
Section B – 5 x 3 = 15 Marks (3 out of 5 to be answered
Section C – 1 x 15 = 15 Marks (1 out of 2 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086

General Elective Course Offered by Department of Physics to

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SYLLABUS

(Effective from the academic year 2011-2012)

HOME ELECTRICAL INSTALLATIONS

CODE: 11PH/GE/HE44 **CREDITS: 4**

L T P: 4 0 0

TOTAL TEACHING HOURS: 52

OBJECTIVES

- To understand the working principles of the domestic electrical appliances.
- To be able to appreciate the principles of home appliances.
- To gain confidence in handling simple repair works.

Unit 1 **(13 Hrs)**

Basic electric circuits

1.1 Basic facts : electric circuits – basic components used in an electric circuit –complete circuit

1.2 Switches – types of switches – plugs and its types – safety practices and measurements

1.3 Principles of single phase and three phase connections.

Unit 2 **(13 Hrs)**

Electrical connections

2.1 Hot wires – nichrome- fuses-fuse wire - melting point – causes and repairing a fuse – lighting circuits -series and parallel circuits – house lights – ring circuit – the earth wire – lightning conductor

2.2 Using and paying for electricity- consumption- KWH- meters.

Unit 3 **(13 Hrs)**

Home appliances

3.1 Wet grinder – mixer – refrigerator – electric iron – heater- microwave oven-washing machine

3.2 Emergency light – incandescent and fluorescent lamps-fittings-chokes-CFL-starter-inverter

3.3 Motor pump(horse power)-jet pump-electric fan-regulator (SCR)-control rheostat—rice cooker(thermostat)-voltage stabilizer.

Unit 4 **(7 Hrs)**

Demonstration and Hands on Training-I

1. Experiments on closed, open, short, series and parallel circuits.
2. Wiring practice of switches and plugs.
3. Measurement of current and voltage using multimeter.

Unit 5 **(6 Hrs)**

Demonstration and Hands on Training-II

1. Replacing fuses.
2. A model of house wiring.
3. Tubelight connection.

BOOKS FOR STUDY AND REFERENCE:

Bob Fairbrother, Electricity in the Home, Bell and Bain Ltd., New York(1980).

Lindslaey Trevor, Basic Electrical Installation Work, Newnes Pub, Great Britain(2005).

END SEMESTER EXAMINATION:

Total Marks: 50 Duration: 2 Hours

QUESTION PAPER PATTERN

Section A – 10 x 2 = 20 Marks (All questions to be answered)
Section B – 5 x 3 = 15 Marks (3 out of 5 to be answered
Section C – 1 x 15 = 15 Marks (1 out of 2 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

General Elective Course Offered by Department of Physics to

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SYLLABUS

(Effective from the academic year 2011 – 2012)

PHOTOGRAPHY

CODE: 11PH/GE/PG44 **CREDITS: 4**

L T P: 2 0 2

TOTAL TEACHING HOURS: 52

OBJECTIVES

- To learn the basics of photography
- To learn and experiment with different types of camera operations
- To have basic knowledge of digital photography

Unit 1 (12 Hrs)

Camera components and lighting

1.1 Basic camera components- comparison between human eye and camera-viewing and focusing systems- view finder-range finder- single and twin lens reflex-types of cameras.

1.2 Lens: wide angle lenses-telephoto lenses-zoom lenses-mirror lens. shutters-types of shutters-leaf shutter-focal plane shutter- aperture- f-number scales f-numbers and exposure time.

1.3 Lighting: front lighting-half-side (45º) lighting-side lighting-back lighting- indoor lighting-available light-artificial light-using flash-bounce flash-fill in flash.

Unit 2 (7 Hrs)

Printing

2.1 Filters – how filters work-filters for correction-filters for contrast-special purpose colors filters-viewing filters-graduated sky filters.-haze filters-color separation filters.

2.2. Developing the film-enlarger-printing papers-the printing process-making a photogram-printing from negatives.

Unit 3 (7 Hrs)

Digital photography

3.1 Introduction-Digital cameras-camera basics- Scanners.

3.2 Digital camera systems: Charge Coupled Device(CCD)-card reader.

3.2 Modes of transferring technique-color mixing-resolution-color saturation

Unit 4 **(13 Hrs)**

Practicals-I

10. Handling and using camera.
11. Identification of raw materials and cameras.
12. Preparation of chemicals for film development and printing.
13. Photogram.

Unit 5 **(13 Hrs)**

Practicals-II

1. Developing black and white negative.
2. Printing and enlarging black and white positive
3. Color photography-printing.
4. Photo editing using Adobe-Photoshop.

BOOKS FOR STUDY

George T.Carver. & Eugene E.Lee, Beginning Photography, PrenticeHall.Inc.Englewood Cliffs. New Jersey 07632.(1985)

Jacqueline Dineen, Young Photographer's Pocket Book, Purnell Books, Paulton, Bristol BS185LQ. (1984)

BOOKS FOR REFERENCE

Busch David D, Digital Photography, Prentice Hall, New Jersey(2005)

Gordon Roberts, Mastering Photography, Macmillan Press Ltd(1995).

Langford Michael J., Basic Photography, The Focal Press London and New York(1971).

Langford Michael J., SLR Handbook, Dorling Kindersly limited, London(1980).

Robert Shufflebotham, , Photoshop 7 in easy steps**,** Dreamtech, New Delhi(2005).

END SEMESTER EXAMINATION:

Total Marks: 50 Duration: 2 Hours

QUESTION PAPER PATTERN

Section A – 10 x 2 = 20 Marks (All questions to be answered)
Section B – 5 x 3 = 15 Marks (3 out of 5 to be answered
Section C – 1 x 15 = 15 Marks (1 out of 2 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

Allied Core Course Offered by the Department of Physics to the students of Chemistry

SYLLABUS

(Effective from the academic year 2011 – 2012)

PHYSICS FOR CHEMISTRY –II PRACTICAL

CODE: 11PH/AC/P241 **CREDITS:2**

L T P: 0 0 2*

TOTAL HOURS: 26

17. Rigidity Modulus 'G' by Static Torsion
18. Newton's rings – Determination of Radius of curvature of a lens
19. Spectrometer – grating – standardization of the grating (N)- determination of wavelengths (λ)
20. Joule's coil – determination of specific heat of a liquid – half time correction
21. Potentiometer – ammeter calibration (low range)
22. Field along the axis of a coil carrying current – determination of B_H
23. Transistor characteristics – CE mode
24. Construction of AND and OR gates using junction diodes and NOT gate using transistor, AND ,OR & NOT using IC's

* 1 practical session of 2 Hrs. duration per week.

BOOK FOR STUDY

Ouseph, C.C., Srinivasan, V., & Balakrishnan,R. (1992), **A Text Book of Practical Physics, Vol. I & II**., S. Viswanathan Pvt. Ltd. Madras.

PATTERN OF EVALUATION

Total Marks : 50 Duration : 3hrs

Formula & Procedure	20
Observation	20
Calculation & Result	10

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086

Allied Core Course Offered by the Department of Physics to students of Chemistry

SYLLABUS

(Effective from the academic year 2011 -2012)

PHYSICS FOR CHEMISTRY –II

CODE : 11PH/AC/PC43 **CREDITS : 3**

L T P : 3 0 0

TOTAL TEACHING HOURS : 39

OBJECTIVES

- To understand the basic concepts of Electricity and Magnetism.
- To appreciate the developments in Modern Physics and Electronics.

Unit 1 **(16 Hrs)**

Electricity and Magnetism

1.1 Coulomb's law of inverse squares – electric field definition – flux of electric field – Gauss's law – application of Gauss's law to determine
   i) field due to a point charge
   ii) field due to a spherical charge distribution
   iii) field due to infinite line charge distribution
   iv) field due to a cylindrical charge distribution

1.2 Conservative nature of electrostatic field – electric field – electric potential – potential at a point due to point charge- relation between potential and field strength

1.3 Capacitance : principle- capacitance of a parallel plate capacitor with and without dielectric

1.4 Magnetic field : definition of B – force on a charge in a magnetic field – force on a charge in an electro magnetic field(Lorentz force) – Maxwell's electromagnetic equations (no derivations) – physical significance of the equations.

1.5 Magnetic properties of materials: relation between relative permeability and susceptibility- hysterisis- magnetometer method of drawing hysterisis curve- energy laws – retentivity- coercivity – uses of hysterisis curves

1.6 Electromagnetism : force on a current carrying conductor in a magnetic field – moving coil ballistic galvanometer – figure of merit of ballistic galvanometer for charge and current sensitivity

Unit 2 **(10 Hrs)**

Modern Physics

2.1 MASER : description and working of Ammonia MASER

2.2 LASER : LASER action – population inversion – Carbon dioxide LASER – applications

2.3 Holography : principles – preparation of holograms applications

2.4 Fibre Optics : principles – characteristics – classification – applications

Unit 3 **(13 Hrs)**

Electronics

3.1 Operational amplifier – ideal op- amp - CMRR – inverting and non-inverting op- amp - summing, difference, integral and differential op-amp.

3.2 Digital electronics : number system – decimal to binary conversion – binary addition- subtraction – multiplication – division

3.2 OR – AND – NOT – gates – construction of OR – AND – NOT gates using diodes and transistors- Boolean algebra- De Morgan's theorem – verification.

BOOKS FOR STUDY AND REFERENCE

Haliday, David and Robert Resnick, Physics Vol. II**,** New Age Int. Ltd., Chennai, (1995).

Kakani, S L, & Bhandari K C, A Text Book of Optics**,** Sultan Chand & Sons, Educational Publishers New Delhi, (2002).

Laud .B.B Lasers and non – Linear Optics**,** Wiley Eastern New Delhi,(1991).

Mahajan, A.S.,& Rangwala, A.A., Electricity and Magnetism, Tata McGraw Hill Publishing Co., Ltd. New Delhi,(1993).

Mehta, V.K., Principles of Electronics, S. Chand and Co., Ltd. New Delhi, (1991).

Murugeshan.R, Modern Physics, S. Chand and Company Pvt. Ltd., New Delhi, (1992).

Subrahmanyam, N. & Lal Brij., A Text Book of Electricity and Magnetism, Ratan Prakash Mandir, Agra,(1994).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered)

Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5

Section B – 5 x 6 = 30 Marks (5 out of 7 to be answered (5 problems & 2 theory))

Section C – 2 x 20 = 40 Marks (2 out of 4 to be answered)

STELLA MARIS COLLEGE, (AUTONOMOUS), CHENNAI-600 086

B.Sc. DEGREE: BRANCH III –PHYSICS

SYLLABUS

(Effective from the academic year 2011-2012)

OPTICS AND SPECTROSCOPY

CODE: 11PH/MC/OS 44 **CREDITS: 4**

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To expose the students to the fundamentals of optics.
- To provide the students a clear idea about the applications of optics .

Unit 1 **(13 Hrs)**

Geometrical optics

1.1 Fermat's principle of least time – importance of Fermat's principle in relation to the main postulates of geometrical optics – rectilinear propagation of light reversibility of the path of the rays of light – the laws of reflection and refraction of light.

1.2 Thick lenses – focal length , critical thickness ,power and cardinal points of a thick lens.

1.3 Lens aberrations: monochromatic aberrations – spherical aberration- coma-astigmatism - curvature of the field – distortion – chromatic aberrations-methods of minimizing aberrations.

1.4 Eyepieces: advantage of an eyepiece over a simple lens – Huyghen's and Ramsden's eyepieces – construction and working – relative merits and demerits of the eyepiece.

Unit 2 **(13 Hrs)**

Interference

2.1 Division of wave front : Fresnel's biprism –theory- fringes with white light

2.2 Division of amplitude : Interference in thin films due to (i) reflected light (ii) transmitted light – colours of thin films- Newton's rings – theory.

2.3 Interferometers : Michelson's Interferometer- applications (i) determination of the wavelength of a monochromatic source of light (ii) standardization of the meter.

Unit 3 **(13 hrs)**

Diffraction

3.1 Introduction – Fresnel's assumptions – rectilinear propagation of light – zone plate- action of zone plate for an incident spherical wave front-differences between a zone plate and a convex lens.

3.2 Fresnel type of diffraction :- diffraction pattern due to a straight edge –

positions of maximum and minimum intensities – diffraction due to a narrow slit.

3.3 Fraunhofer type of diffraction : Fraunhofer diffraction at a single slit- plane diffraction grating – theory- experiment to determine wavelengths – width of principal maxima – oblique incidence.

3.4 Resolving power of optical instruments : Rayleigh's criterion for resolution – limit of resolution for the eye- resolving power of (i) telescope (ii)microscope (iii) prism (iv) grating.

Unit-IV **(13 hrs)**

Polarisation

4.1 Double Refraction- optic axis principal plane-

4.2 N icol prism- construction and action – Huyghen's explanation of double refraction in uniaxial crystals.

4.3 Elliptically and circularly polarized light –quarter wave plate- half wave plate-
production and detection of circularly polarized light and elliptically Polarized light.

4.4 Optical activity- Fresnel's explanation – specific rotation – Laurentz half shade polarimeter- experiment to determine specific rotatory power.

Unit-V

Spectroscopy **(13 hrs)**

5. 1 Infra red spectroscopy -properties – origin of Infra red spectra – IR Spectrophotometer – Applications.

5.2 Scattering of light –Raman effect –classical theory – Quantum theory mutual
exclusion principle -Raman spectrometer-characterestics of Raman lines – Applications of Raman effect.

5.3 Ultraviolet and visible spectroscopy – single beam spectrophotometer-

5.4 Atomic absorption spectroscopy- introduction- Atomic absorption spectrometer-
applications.

BOOKS FOR STUDY

Banwell N. Colin., Elaine M. McCash, Fundamentals of Molecular Spectroscopy, Tata McGraw Hill Publishing Company, New Delhi(2006).

Chang Raymond, Basic Principles of Spectrocopy **,** McGraw Hill, Kogukusha Ltd., New Delhi(1971).

G.Aruldhas, Molecular structure and Spectroscopy, Prentice –Hall Of India, New Delhi,(2005**).**

Jenkins A.Francis and White, Fundamentals of Optics, McGraw

Hill Inc., New Delhi(1976).

Subramaniam N. and Brijlal, Optics, S.Chand and Co, Pvt. Ltd.New Delhi(2006).

BOOK FOR REFERENCE

Agarwal B. S. Optics, Kedernath Ramnath Publishers**,** Meerut(1979**)**.

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered) in 30 minutes
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5
Section B – 5 x 5 = 25 Marks (5 out of 7 to be answered (5 problems & 2 theory))
Section C – 3 x 15 = 45 Marks (3 out of 5 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. PHYSICS : BRANCH III – PHYSICS

SYLLABUS
(Effective from the Academic year 2011-2012)

EXPERIMENTAL PHYSICS – IV

CODE: 11PH/MC/P442 **CREDITS : 2**
L T P : 0 0 3*
TOTAL HOURS : 39

OBJECTIVE

- To expose the students to the technique of handling the measuring instruments.

1. Joule's calorimeter – determination of specific heat capacity of a liquid – Barton's correction.- Use P.o box to find resistance of the coil.
2. Spectrometer : grating – minimum deviation
3. Polarimeter – determination of specific rotatory power.
4. Young's modulus – Koneig's method
5. Determination of Self inductance using LCR resonance circuit.
6. Potentiometer – determination of emf of a thermocouple.
7. Potentiometer – calibration of low range voltmeter by adjusting the potential difference per meter of the potentiometer wire.
8. Ballistic galvanometer - Determination of the absolute capacity of the condenser.
9. Ballistic galvanometer – (i)comparison of emf (ii) internal resistance of a cell.
10. Computer simulated experiments.

* Atleast 9 experiments to be selected by the course teacher.
* 1 Practical session of 3 hours duration per week.

BOOK FOR STUDY

Ouseph,C. C., V. Srinivasan and R. Balakrishnan, A Text Book of Practical Physics, Vol. I & II., S.Viswanathan Pvt., Ltd. Madras(1992**)**.

PATTERN OF EVALUATION

Total Marks : 50 Duration : 3 hrs

Formula & Procedure	20
Observation	20
Calculation & Result	10

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE : BRANCH – III – PHYSICS
SYLLABUS
(Effective from the academic year 2011 – 2012)

EXPERIMENTAL PHYSICS- V– ELECTRONICS

CODE:11PH/MC /P542 **CREDITS:2**
L T P: 0 0 3*
TOTAL HOURS: 39

OBJECTIVES

- To expose student to the concept of digital principles as applied to microprocessors.
- To develop knowledge in combinational logic and sequential logic circuits and their applications.

1. Zener diode characteristics- voltage regulation
2. Study of Universal gates- arithmetic circuits. (half adder, half subtractor)
3. Karnaugh map simplification
4. 4 bit binary adder and subtractor
5. Decade Counter (7490)
6. Ripple & modulus counters
7. Study of basic application in operational amplifier 741 (adder, subtractor, source follower, multiplier, differentiator and integrator)
8. Square wave generation using 555 timer and operational amplifier 741.
9. FET characteristics

* 1 practical session of 3 hours duration per week in the semester IV

BOOK FOR REFERENCE

Sathian G. Kumar, (2006), **Computer Science - Manual for Digital Electronics and Microprocessor Lab.**

PATTERN OF EVALUATION

Total Marks : 50		Duration : 3 hrs
Formula & Procedure	20	
Observation	20	
Calculation & Result	10	

STELLA MARIS COLLEGE (AUTONOMOUS), CHENAI-600 086

B.Sc. DEGREE: BRANCH III – PHYSICS

SYLLABUS
(Effective from the academic year 2011 **–** 2012)

COMMUNICATION SYSTEMS
(Skill Development Course)

CODE:11PH/ME/CS53 **CREDITS: 3**
L T P: 3 1 0
TOTAL TEACHING HOURS: 52

OBJECTIVES

- To study the basic concepts of communication.
- To understand the principles of optical communication systems.

Unit 1 **(10 Hrs)**

Communication Principles

1.1 Types of modulation – amplitude modulation – modulation factor –analysis of amplitude modulated wave – energy distribution in AM wave.

1.2 Frequency modulation - analysis of frequency modulated wave – phase modulation – comparison of frequency and amplitude modulation.

1.3 Pulse Amplitude Modulation – pulse width – pulse coded modulation (principles only)

Unit 2 **(10 Hrs)**

Radiation Propagation

2.1 Fundamentals of electromagnetic waves – propagation of waves – ground waves – sky waves

2.2 Space wave propagation – effect of earth's curvature – atmospheric effects-ionosphere and its stratification.

Unit 3 **(10 Hrs)**

RADAR systems and Microwave Generations

3.1 Radar Systems – basic principles – basic pulsed radar system – block diagram and description – radar range equation – uses of radar – Doppler radar systems.

3.2 Microwave communication – introduction – generation of microwaves – magnetron oscillator – working – klystron oscillator – velocity modulation– multicavity klystron – reflex klystron.

Unit 4 **(12 Hrs)**

Fibre optic communication

4.1 Introduction – importance of optical fibres – propagation of light waves in an optical fibre – basic structure of an optical fibre – propagation of light wave through an optic fibre – acceptance angle and acceptance cone of a fibre – modes of propagation – meridinial and skew rays.

4.2 Classification of optical fibres – stepped index fibre – disadvantages of monomode fibre – graded index multimode fibre – fibre losses – attenuation in optic fibres- material or impurity loss – absorption loss – radiation induced losses.

Unit 5 (10 Hrs)

Television and Satellite communication

5.1 Types of television cameras-Vidicon- Image orthicon

5.2 LCD – types of LCD-Satellite communication.

BOOKS FOR STUDY

Ambrose, A., T. Vincent Devraj, Elements of Solid State Electronics, Meera Publications, K.K. dist.(1990).

Mehta. V.K., Principles of Electronics, S. Chand and Company Ltd., New Delhi(1993).

Sarkar Subir Kumar, Optical Fibres and Fibre Optic Communication Systems S Chand and Co, New Delhi,(1997).

BOOKS FOR REFERENCE

Haykin, Simon, Digital Communications, John Wiley & Sons, Inc(1998).

Kennedy, George, Electronic Communication Systems, McGraw Hill Publications Co., Ltd., New Delhi(1984).

Lathi B.P., Communication System, Wiley Eastern Limited, New Delhi(1981).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 10 x 3 = 30 Marks (All questions to be answered)

Section B – 5 x 6 = 30 Marks (5 out of 7 to be answered

Section C – 2 x 20 = 40 Marks (2 out of 4 to be answered

STELLA MARIS COLLEGE (AUTONOMOUS), CHENAI-600 086
B.Sc. DEGREE: BRANCH III – PHYSICS

SYLLABUS
(Effective from the academic year 2011 – 2012)

BIOMEDICAL PHYSICS
(Skill Development Course)

CODE: 11PH/ME/BM53 **CREDITS: 3**
L T P: 3 1 0
TOTAL TEACHING HOURS: 52

OBJECTIVES

- To give an insight into the use of principles of physics in Biomedical Instruments.
- To expose the students to the various instruments used in the field of medicine.

Unit 1 **(10 Hrs)**

Diagnostic Imaging

1.1 X-ray production and characteristics: absorption of X- rays – photographic X- ray films – image plates – TV viewing of images.

1.2 Applications of X-ray imaging in medicine: Normal image applications – orthopaedic – fractures – tuberculosis – lung volume – heart enlargement – contrasted image applications – intravenous pyelogram (IVP) – barium X-ray of intestines – angiography and digital subtraction angiography (DSA)

Unit 2 **(10 Hrs)**

Medical Sonography

2.1 Sound and Acoustics – sound spectra acoustic impedance ultrasound imaging – contrast enhanced ultrasound – applications and limitations of ultrasound.

2.2 Stethoscope – phonocardiography – ultrasound and its uses.

Unit 3 **(10 Hrs)**

Electrical Applications

3.1 Action potential and nerve impulse transmission – types of synapse – overview of cardiac cycle and impulse conduction in the heart.

3.2 Applications in diagnostic techniques – electrophysiology in general – electrocardiography (ECG)).

Unit 4

Magnetic Applications **(10 Hrs)**

4.1. Bioelectricity in Brain- spontaneous electrical activity – Biomagnetism- Magneto biology

4.2. Applications in diagnostic techniques : electroencephalography (EEG) – electromyography – Lorentz force – magneto encephalography (MEG

Unit 5 (12 Hrs)

Nuclear Medicine

4.1 Nuclear radiations – radioactivity and radioactive transitions (descriptions on process, emitted particles and their characteristic radio nuclides) - decay and activity – half life – interaction with matter (interaction processes and rates : penetration and range) – radiation units (physical units and biological units)

4.2 Tools for diagnostics – radioactivity in medical diagnostics – tracer techniques – nuclear radiations for diagnostics – gamma radiation – gamma camera – positron emission tomography (PET).

4.3 Tools for therapeutics – basic ideas about accelerators – types of radiation and method of production – radiation therapy for cancer – effect of radiation on living tissue.

BOOKS FOR STUDY AND REFERENCE

Glaser Roland , Biophysics, Springer – Verlap Publications, Germany(2001).

Mettler A. Fred., Guibertean J. Milton., Essentials of Nuclear Medicine Imaging, Elsevier Publications , Canada(2005).

Roy N. R., Medical Biophysics, Books and Allied (P) Ltd, Calcutta(2001) .

Saha B. Gopal ., Physics and Radiobiology of Nuclear Medicine, Springer Publications , Germany(2006).

Tuszynski J. A., Dixon J. M., Biomedical Applications for Introductory Physics, Wiley Publications , New Jersey(2001).

Vasantha Pattabhi and N , Gauthan, Biophysics**,** Narosa Publishing House, New Delhi(2009).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 10 x 3 = 30 Marks (All questions to be answered)
Section B – 5 x 6 = 30 Marks (5 out of 7 to be answered
Section C – 2 x 20 = 40 Marks (2 out of 4 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086

B.Sc. BRANCH III – PHYSICS

SYLLABUS

(Effective from the academic year 2011-2012)

ELECTROMAGNETISM

CODE:11PH/MC/EM54 **CREDITS: 4**

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To present the fundamental topics of classical electromagnetic theory.
- To emphasize the unity of electric and magnetic phenomena.

Unit 1 **(13 Hrs)**

Electrostatics

1.1 Electrostatic field - Coulomb's Law – divergence and curl of electrostatic field – Gauss's law – application – cylindrical charge distribution – spherical charge distribution

1.2 Electric potential - Poisson's equation – Laplace's equation – work done in moving a charge – energy of a point charge distribution - energy of a continuous charge distribution – electrostatic boundary conditions.

1.3 Capacitors - parallel plate capacitors – spherical plate capacitors.

Unit 2 **(10 Hrs)**

Electrostatic Fields In Matter

2.1 Polarisation - induced dipoles – alignment of polar molecules - polarisation vector – bound charges

2.2 Field inside a dielectric – Gauss's law in the presence of dielectrics – linear dielectrics.

Unit 3 **(18 Hrs)**

Magnetostatics

3.1 Lorentz force law - cyclotron motion – cycloid motion – currents – current density – continuity equations for current flow.

3.2 Biot – Savart law – steady currents – magnetic fields due to steady currents flowing (i) in a long straight wire at a point near it (ii) along a circular coil at a point on its axis (iii) along a solenoid at a point on its axis.

3.3 Divergence and curl of **B** - straight line currents – Ampere's law – (i) magnetic field at a point near a long straight wire carrying steady current. – (ii)magnetic field of a long solenoid (iii)magnetic field of a toroidal coil – comparison of magnetostatics and elctrostatics.

3.4 Magnetic vector potential - Ampere's law in terms of vector potential – magnetostatic boundary conditions.

Unit 4 **(12 Hrs)**

Magnetostatic Fields in Matter

4.1 Magnetic properties of materials – torques and forces on magnetic dipoles– magnetization

4.2 The field caused by a magnetized object – bound currents – physical interpretation of bound currents - magnetic field inside matter

4.3 The auxiliary field **H** – ampere's law in magnetized materials

4.4 Linear and non-linear media – magnetic susceptibility – magnetic field and its equations (i) $B = \mu_o (H+M)$ (ii) $\mu = \mu_o (1+\chi_m)$ (iii) $\mu_x = 1+\chi_m$

Unit 5 **(12 Hrs)**

Electrodynamics

5.1 Faraday's Laws – electromagnetic induction – inductance - self inductance – mutual inductance – energy in magnetic fields.

5.2 Maxwell's equations – Maxwell's equations and magnetic charge – Maxwell's equations inside matter - boundary conditions

BOOKS FOR STUDY

Griffiths David J., , Introduction to Electrodynamics, Prentice Hall of India Pvt. Ltd., New Delhi(1997).

Halliday David, Resnik Robert and Walker Jearl, , Fundamentals of Physics, John Wiley and Sons, New Delhi,(2005).

BOOKS FOR REFERENCE

Chattopadhyay D., and Rakshit P.C., Electricity and Magnetism, New Central Book Agency, Kolkata(2005).

Mahajan A.S and A. A Rangwala, Electricity and Magnetism**,** Tata McGraw Hill Publishing Co.Ltd., New Delhi(1988).

Sehgal, D.L., K.L. Chopra, N.K. Sehgal, Electricity and Magnetism, Sultan Chand and Sons, New Delhi(1992).

Tewari K.K., Electricity and Magnetism**,** S. Chand and Co. Ltd., New Delhi(1987).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered) in 30 minutes
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5
Section B – 5 x 5 = 25 Marks (5 out of 7 to be answered (5 problems & 2 theory))
Section C – 3 x 15 = 45 Marks (3 out of 5 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE : BRANCH – I – PHYSICS

SYLLABUS

(Effective from the academic year 2011 – 2012)

MICROPROCESSORS AND MICROCONTROLLERS

CODE:11PH/MC/MM54 **CREDITS: 4**

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To acquire knowledge about the architecture of microprocessor 8085.
- To develop skills in writing assembly languages programs in microprocessor 8085.
- To understand the basic concepts of the microcontroller 8051.

Unit 1

Central Processing Unit (CPU) (16 Hrs)

1.1 Bus structure- address, data and control system bus- memory and I/O interface block diagram- CPU 8085

1.2 Architecture: general purpose registers, ALU, accumulator, program counter, instruction register, stack, push/pop operations, flag register. fetch cycle and execute cycle flow of an instruction word.

1.3 Addressing modes: direct, register, immediate, register in-direct addressing modes.

1.4 Instruction set: data transfer group, arithmetic group, and logic group instruction.

Unit 2

Software Program (16 Hrs)

2.1 Arithmetic operations: addition, subtraction, multiplication and division of single byte numbers - multi-byte addition.

2.2 Search an array for a given byte-sorting an array in ascending/descending order- block move an array-reverse an array.

2.3 Conversion of BCD to hexadecimal and vice versa-square root of a positive single byte number.

Unit 3

Interfacing memory and I/O devices (16 Hrs)

3.1 Memory map- exhaustive decoding- partial decoding- memory system-interface with 8085.

3.2 Type of interfacing devices: address decoding for I/O – input and output ports- programmable I/O ports- programmable interface- programming the 8255A.

Unit 4

Interrupt Circuit (8 Hrs)

4.1 8085 interrupt circuit-restart instructions-hardware interrupts-interrupt priorities.

4.2 Mask able interrupts-SIM and RIM instructions

Unit 5

Microcontrollers and Embedded systems (9 Hrs)

5.1 Micro-Controller-8051- architecture-applications-embedded system concept-embedded microcontroller pic series-applications

BOOKS FOR STUDY

Ramesh Gaonkar, Microprocessor Architecture, Programming and Applications with the 8085, Penram International Publishing (India) Private Limited(1997),.

Vijayendran, V, Fundamentals of Microprocessor- 8085 Architecture Programming and Interfacing, S. Viswanathan (Printers and Publishers), Pvt. Ltd., Chennai (2006).

Vahid Frank and Givargis Tony, Embedded System Design-Unified Hardware Software Introduction, John Wiley &sons,inc (2002)

BOOKS FOR REFERENCE

Adithya .P. Mathur., Introduction to Microprocessors, Tata McGraw Hill Publishing Co., Ltd. New Delhi. (1995)

Er.R Gopalsamy, Microcontroller, Veni Publishers, Madurai (2004).

Ghosh,A.K., & P.K. Sridhar, 0000 to 8085 Introduction to Microprocessor for Engineers and Scientists, PHI publishers (1995).

Kenneth J. Ayala, Second Edition, 8051 Microcontroller – Architecture, Programming and applications, Penram International Publishing (India) Private Limited(1996).

Milman and Halkias, Integrated Electronics, McGraw Hill Pub. Co. Ltd., New Delhi (1992).

Mohammed Rafi Qubbaman, Microprocessors and Microcomputer – Based System Design, UBS New Delhi ,(1986).

Rajkamal, Microcontroller, Architecture, Programming, Interfacing and System Design, Pearson Education (2005).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered) in 30 minutes
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5
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Section C – 3 x 15 = 45 Marks (3 out of 5 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. PHYSICS : BRANCH III – PHYSICS

SYLLABUS
(Effective from the Academic year 2011-2012)

EXPERIMENTAL PHYSICS – VI

CODE: 11PH/MC/P652 **CREDITS : 2**
L T P : 0 0 3*
TOTAL HOURS : 39

OBJECTIVE

- To expose the students to the technique of handling the measuring instruments.

1. Spectrometer : i –i' curve of a prism.- Stoke's formula.
2. Spectrometer – i– d curve.
3. Spectrometer – grating – oblique incidence.
4. Michelson's Interferometer.
5. Ballistic galvanometer – comparison of capacities.
6. Ballistic galvanometer – Determination of high resistance by leakage.
7. Potentiometer – calibration of high range voltmeter
8. Copper voltameter – determination of e.ec.e of copper – T. G
9. Carey Foster's Bridge- Verifiaction of laws and Specific resistance.
10. Computer simulated experiment

* Atleast 9 experiments to be selected by the course teacher.
* 1 Practical session of 3 hours duration per week.

BOOK FOR STUDY

Ouseph,C. C., V. Srinivasan and R. Balakrishnan, A Text Book of Practical Physics, Vol. I & II., S.Viswanathan Pvt., Ltd. Madras(1992**)**.

PATTERN OF EVALUATION

Total Marks : 50 Duration : 3 hrs

Formula & Procedure	20
Observation	20
Calculation & Result	10

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.SC. DEGREE : BRANCH – III – PHYSICS

SYLLABUS

(Effective from the academic year 2011 – 2012)

EXPERIMENTAL PHYSICS- VII – ELECTRONICS

CODE:11PH/MC/P752 **CREDITS: 2**

L T P: 0 0 3*

TOTAL HOURS: 39

OBJECTIVES

- To expose student to the concept of digital principles as applied to microprocessors.
- To develop knowledge in combinational logic and sequential logic circuits and their applications.

1. Construction of regulated power supply 5V and (12-0-12)V
2. R-C coupled amplifier
3. BCD adder (7483)
4. Sine wave oscillator – phase shift using IC 741
5. Microprocessor application – Arithmetic operation (8 bit)- addition, subtraction, multiplication and division
6. Microprocessor application code conversion (BCD to Hex and Hex to BCD)
7. Microprocessor application- sorting an array in ascending and descending order
8. Microprocessor application: Traffic regulation interface and Stepper motor interface
9. i. Programmable counter 8255 interface shift counter, ring counter
   ii. Square wave generation using DAC
10. Data Selector – Study of multiplexer.

***** At least 9 experiments to be selected by the course teacher.

- 1 practical session of 3 hours duration per week

BOOK FOR REFERENCE

Sathian G. Kumar, Computer Science- Manual for Digital Electronics and Microprocessor Lab(2006)**.**

PATTERN OF EVALUATION

Total Marks : 50 Duration : 3 hrs

Formula & Procedure	20
Observation	20
Calculation & Result	10

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086

B.Sc. DEGREE: BRANCH III – PHYSICS

SYLLABUS
(Effective from the year 2011 – 2012)

SOLID STATE PHYSICS

CODE : 11PH/MC/SS54 **CREDITS : 4**
L T P : 4 1 0
TOTAL TEACHING HOURS : 65

OBJECTIVES

- To learn about crystal binding and the imperfections in crystals
- To study the properties of solids

Unit 1 **(13 Hrs)**

Crystal Bonding

1.1 Bonding in solids – bond energy- bond length-types of bonding –primary bonds- ionic bonding – potential energy diagram of ionic molecule – cohesive energy of ionic solids- Madelung constant for NaCl crystal – Born-Haber cycle properties of ionic solids

1.2 Covalent bond (qualitative treatment only) – properties of covalent solids Metallic bond – properties of metallic solids

1.3 Secondary bonds- Van der Waal's bond (molecular bond) – Van der Waal's Bond formation in Helium- properties of Van der Waal bonded solids- hydrogen bonding – hydrogen bond formation in water-properties of hydrogen bonded solids.

Unit 2 **(12 Hrs)**

Crystal Imperfections

2.1 Classification of imperfections – crystallographic imperfections – lattice defects– Schottky defect – calculation of number of Schottky defects in a crystal- Frenkel defect – calculation of number of Frenkel defects in a crystal

2.2 Colour centres – F- centre – other centres in alkali halides – V- centre

Unit 3 **(12 Hrs)**

Electrical Properties of Solid

3.1 Classical Free electron theory of metals – the free electron gas – Drude Lorentz free electron theory – Ohm's law – expressions for electrical conductivity – thermal conductivity-Wiedemann and Franz ratio

3.2 Hall effect – Hall voltage – Hall coefficient – mobility and Hall angle – experimental determination of Hall coefficient

Unit 4 **(14 Hrs)**

Magnetic Properties Of Solids

4.1 Different types of magnetic materials – Langevin's theory of diamagnetism (qualitative treatment only) – Langevin's theory of paramagnetism-Curie's law-failure of Langevin's theory-Weiss theory of paramagnetism-Curie- Weiss law.

4.2 Ferromagnetism-domain theory of ferromagnetism- exchange energy-magnetic energy-anisotropic energy-domain wall-hysteresis loop of a ferro magnetic material-explanation of hysteresis with domain theory

4.3. Qualitative explanation of antiferromagnetism-Neil temperature-ferrimagnetism - ferrites – application of ferromagnets and ferrites

Unit 5 **(14 Hrs)**

Superconductivity

5.1 Introduction – experimental survey – effect of magnetic field – magnetic properties of superconductors – perfect diamagnetism or the Meissner effect – type I and type II superconductors – isotope effect

5.2 Thermodynamic effects – entropy, specific heat, thermal conductivity – energy gap –electrodynamics of superconductors – first and second London equations –drawback of London theory

5.3 Quantum tunneling – Josephson's effect (qualitative treatment only) – Qualitative explanation of BCS theory of superconductivity – application of superconductors.

BOOKS FOR STUDY

Ali Omar M., Elementary Solid State Physics, Replika Pvt. Ltd., New Delhi(2006).

Pillai,S.O., Solid State Physics, New Age International(P) Ltd, New Delhi(2006).

Saxena, B.S., R.C. Gupta and P.C. Saxena Fundamentals of Solid State Physics, Pragati Prakashan Pub, Meerut (2001).

Singhal, R.L., Solid State Physics, K.Nath and Ram Nath Pub.Co., Meerut(2003).

BOOKS FOR REFERENCE

Azarof Leonid. V., Introduction to Solids**,** Tata McGraw Hill Pub Co., New Delhi (2002).

Charles Kittel, Introduction to Solid State Physics, Kin Keong Printing Co. Ltd., Singapore (2005).

Ilangovan. K, Solid State Physics, S.Viswanathan Pvt, Ltd., Chennai(2007).

Saxena. H.C. and Agarwal, K.LPrinciples of Electronics and Solid State Physics, Ravi Offset Printers and Publishers, Agra (2005).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered) in 30 minutes
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5
Section B – 5 x 5 = 25 Marks (5 out of 7 to be answered
Section C – 3 x 15 = 45 Marks (3 out of 5 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH III – PHYSICS

SYLLABUS

(Effective from the academic year 2011 – 2012)

LASER PHYSICS

CODE: 11PH/ME/LP63 **CREDITS: 3**

L T P: 3 1 0

TOTAL TEACHING HOURS: 52

OBJECTIVES

- To study the principles of Laser
- To be acquainted with the different types of Lasers and their applications.

Unit 1 **(10 Hrs)**

Basic Theory

1.1 Quantum nature of light – energy levels – thermal equilibrium - population — population inversion - pumping methods - absorption – spontaneous and stimulated emission – condition for stimulated emission – Einstein's coefficients – relation between them – Schawlow -Towne's threshold condition for Laser oscillations in terms of population difference

1.2 Optical resonator – action of optical resonators – cavity configuration - plane parallel cavity, confocal cavity, hemispherical and long radius cavity

Unit 2 **(10 hrs)**

Rate Equations and Solid State Lasers

2.1 Qualitative explanation of line broadening mechanism-rate equations for two and three level systems – qualitative explanation of four level system – characteristics of Laser beam.

2.2 Types of Lasers - solid state Laser – Ruby Laser – description- energy level working- spiking-Nd : YAG Laser - description - energy level diagram – working

Unit 3 **(10 Hrs)**

Gas and Liquid Lasers

3.1 Gas Lasers – neutral atom gas Laser (helium neon Laser) – description - energy level diagram - working - molecular gas Laser (carbon dioxide Laser) - description - energy level diagram – working.

3.2 Liquid Laser – dye Laser - description - energy level diagram – working

3.3 Chemical Laser–HCl Laser – CO Laser

Unit 4 **(10 Hrs)**

Semiconductor Laser and Holography

4.1 Semiconductor Laser – intrinsic semiconductor Laser - doped semiconductor Laser – PN junction– injection Laser.

4.2 Introduction to holography –recording and reconstruction of the image - characteristics –applications in holography

Unit 5 **(12 Hrs)**

Applications

5.1 Laser in industry – drilling - cutting – welding – Laser printing - Lasers in nuclear energy – isotope separation – nuclear fusion -Lidar – precision length measurement – velocity measurement

5.2 Lasers in medicine – cancer therapy– laser eye surgery, laser angioplasty, Lasers in defense.

5.3 Lasers in consumer electronics industry –bar code scanners - Lasers in communications-block diagram-basic principles of optical computers-.Laser ablations.

BOOKS FOR STUDY

Avahanulu .M.N, An Introduction to Lasers**,** S. Chand & Company Ltd, Ram Nagar, New Delhi (2005).

Laud B.B., Lasers and Non – Linear Optics**,** Wiley Eastern Limited, New Delhi(1985).

BOOKS FOR REFERENCE

Thyagarajan K.and A.K. Ghatak, , Lasers, Macmillan India Ltd., Madras(1981).

Wison, J & J.F.B. Hawkes, Optoelectronics – An Introduction, Prentice Hall, New York(1987).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 10 x 3 = 30 Marks (All questions to be answered)
Section B – 5 x 6 = 30 Marks (5 out of 7 to be answered
Section C – 2 x 20 = 40 Marks (2 out of 4 to be answered)

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE: BRANCH III – PHYSICS

SYLLABUS

(Effective from the academic year 2011 – 2012)

NANO SCIENCE

CODE: 11PH/ME/NS63 **CREDITS: 3**

L T P: 3 1 0

TOTAL TEACHING HOURS: 52

OBJECTIVES

- To introduce the students to the developing field of nanoscience and technology
- To provide necessary understanding on the methods of synthesis, characterization techniques and applications of nanomaterials.

Unit 1 **(10 Hrs)**

Introduction to nanoscience

1.1 Introduction- nano and nature-background to nanotechnology- nanoscale – time and length scale in structures.

1.2 Evolution of band structures and Fermi surfaces-electronic structure of nanocrystals.

1.3 Bulk to nano transition-size and shapes-dimensionality and size dependent phenomena.

Unit 2 **(10hrs)**

Nano particles and its properties

2.1 Metal nanoparticles: Size control of metal nanoparticles, structural, surface, electronic and optical properties.

2.2 Semiconductor nanoparticles: Solid state phase transformation, excitons, quantum confinement effect, semiconductor quantum dots, correlation of properties with size.

2.3 Carbon nanostructures: Introduction- Fullerenes- C60-CNT- mechanical and optical properties.

Unit 3 **(10hrs)**

Synthesis of nanomaterials

3.1 Chemical and co-precipitation- sol-gel synthesis of metal oxides - solvothermal-microwave heating synthesis.

3.2 Sonochemical- electrochemical synthesis – photochemical synthesis

Unit 4 **(10hrs)**

Characterisation techniques

4.1 Powder X-ray diffraction

4.2 Scanning electron microscope(SEM)- Transmission electron microscope(TEM).
4.3 UV-vis absorption spectroscopy-Photo luminescence.

Unit 5 **(12hrs)**

Applications of nanomaterials

5.1 Nanosensors: Electro chemical sensors and bio-sensors.
5.2 Energy: solar cells-LED's-photovoltaic device applications.
5.3 Medical: Imaging of cancer cells - targeted nanodrug delivery system.
5.4 Carbon nanotubes: Field emission –fuel cells – display devices.

BOOKS FOR STUDY AND REFERENCE

B. Viswanathan, Nano Materials, Narosa Publishing House Pvt, Ltd,India (2010).

John D. Miller, A Hand Book on Nanophysics, Dominant Publishers and Distributors, India (2008).

CharlesP.Poole,Jr.,Frank J. Owens, Introduction to Nanotechnology, Wiley Student Edition (2009).

Mick Wilson, Kamalikannangora Geoff Smith, Michelle Simmons, Burkhard Raguse, Nanotechnology- Basic Science and Emerging Technologies, Overseas press (2005).

T. Pradeep, Nano: The Essentials, Tata Mcgraw Hill Publishing company Ltd ,(2007),.

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 10 x 3 = 30 Marks (All questions to be answered)
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STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. PHYSICS : BRANCH III – PHYSICS

SYLLABUS
(Effective from the Academic year 2011-2012)

EXPERIMENTAL PHYSICS – VIII

CODE: 11PH/MC/P862 **CREDITS : 2**
L T P : 0 0 3*
TOTAL HOURS : 39

OBJECTIVE

- To expose the students to the technique of handling the measuring instruments.

1. Spectrometer - narrow angled prism.
2. Spectrometer – study of solar spectrum
3. Hysterisis – magnetometer method – B-H curve
4. Ballistic galvanometer – measurement of absolute inductance.
5. Ballistic galvanometer – comparison of mutual inductance.
6. Field along the axis of the coil – Dtermination of B H using Vibration magnetometer.
7. Carey Foster's Bridge- temperature coefficient.
8. Air wedge – thickness of the wire – LASER
9. Fresnel's Biprism – Determination of the wavelength of the sodium source
10. Computer simulated experiment

* Atleast 9 experiments to be selected by the course teacher.
* 1 Practical session of 3 hours duration per week.

BOOK FOR STUDY

Ouseph,C. C., V. Srinivasan and R. Balakrishnan, A Text Book of Practical Physics, Vol. I & II., S.Viswanathan Pvt., Ltd. Madras(1992**)**.

PATTERN OF EVALUATION

Total Marks : 50		Duration : 3 hrs
Formula & Procedure	20	
Observation	20	
Calculation & Result	10	

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086

B.Sc. DEGREE : BRANCH – III – PHYSICS

SYLLABUS

(Effective from the academic year 2011 – 2012)

QUANTUM MECHANICS AND RELATIVITY

CODE: 11PH/MC/QR64 **CREDITS: 4**

L T P: 4 1 0

TOTAL TEACHING HOURS:65

OBJECTIVES

- To introduce the basic concepts and fundamental phenomena of quantum physics and relativity
- To understand the nature of particles from macro to micro states.
- To understand the relationship between space and time, mass and energy.

Unit 1 **(12 Hrs)**

Wave like properties of particles:

1.1 Matter waves- de Broglie postulates- de Broglie wavelength-Davisson and Germer experiment

1.2 Wave – particle duality- complementarity principle- Einstein's interpretation of duality for radiation- Born's interpretation of duality for matter- wave functions- superposition principles

1.3 Properties of matter waves- relation between wave, group and particle velocities

Unit 2 **(17 Hrs)**

Schrödinger's theory of quantum mechanics and applications

2.1 Role of Schrödinger's theory- limitation of de Broglie hypothesis- need for differential equation

2.2 Time independent Schrödinger's equation- time dependent Schrödinger's equation

2.3 Application to one dimensional problems: particle in a one dimensional box- the step potential- rectangular potential barrier- examples of barrier penetration by particles- linear harmonic oscillator

2.4 Application to three dimensional problems: the free particle- particle in a three dimensional box- degeneracy

Unit 3 **(10 Hrs)**

Quantum mechanical operators

3.1 Definition of an operator- operator algebra- eigen values and eigen functions

3.2 Commutation relation between momentum and free particle Hamiltonian operators

3.3 Linear operators- Hermitian operators- properties- parity operators- properties- commutation relation between parity and symmetric Hamiltonian operators- commutation relations between the components of orbital angular momentum

Unit 4 **(16 Hrs)**

Relativity

4.1 The experimental background of the theory of relativity- Galilean transformations- Newtonian relativity- attempts to locate the absolute frame- Michelson-Morley experiment- explanation of negative results- postulates of special theory of relativity

4.2 Relativistic kinematics- Lorentz transformation equation (derivation) – consequence of Lorentz transformation equation (i) length contraction (ii) time dilation (iii) relativity and simultaneity – order of events- experimental verification of length contraction and time dilation concepts- meson paradox- twin paradox.

Unit 5 **(10 Hrs)**

Relativity

5.1 Relativistic mechanics- proper time and proper velocity- relativistic energy and momentum

5.2 Mass - energy equivalence- evidence in support of mass- energy relation between momentum and energy

BOOKS FOR STUDY

Gupta S.L., V. Kumar , H V Sharma , R C Sharma , Quantum Mechanics**,** Jai Prakash Nath and Co., Meerut(2004).

Prakash Sathya, Relativistic Mechanics, Pragathi Prakashan, Meerut(1993).

Resnick Robert, Introduction to the Special Theory of Relativity**,** Wiley Eastern Ltd., Chennai(1992).

BOOKS FOR REFERENCE

Beiser Arthur, Concepts of Modern Physics, Tata Mc Graw Hill Publishing Co., Ltd., New Delhi(2004).

Eisberg Robert, Robert Resnick, Quantum Physics, John Wiley and Sons, New York. (2002).

Mathews P.M, A Text Book of Quantum Mechanics, Tata McGraw Hill, New Delhi. (1976).

Merzbacher Eugen, , Quantum Mechanics**,** John Wiley and Sons, New York(1999).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered) in 30 minutes
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STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI 600 086

B.Sc. DEGREE : BRANCH III - PHYSICS

SYLLABUS

(Effective from the academic year 2011 – 2012)

SEMICONDUCTOR ELECTRONICS

CODE: 11PH/MC/SE64 **CREDITS: 4**

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To help the students develop an appreciation relating the design and applications of amplifiers.
- To understand the basic principles of operational amplifiers.

Unit 1 **(14 Hrs)**

Transitor biasing

1.1 Biasing of transistor – faithful amplification – stability factor

1.2 Methods of transistor biasing – base resistor method – voltage divider bias method -operating point – load line analysis – DC and AC load lines

Unit 2 **(15 Hrs)**

Transistor amplifiers

2.1 Transistor Amplifiers : single stage transistor amplifier– practical circuit of transistor amplifier – multistage transistor amplifier.

2.2 RC Coupled transistor amplifier – operation – frequency response - advantages – disadvantages.

Unit 3 **(15 Hrs)**

Special semiconductor devices

3.1 Field effect transistors – JFET – working – channel conductance – space charge distribution – difference between JFET and bipolar transistor – JFET as an amplifier – IV characteristics – pinch off voltage – parameters of JFET .

3.2 Uni junction transistor – construction – operation – interbase resister – equivalent circuit – intrinsic stand off ratio – IV characteristics – peak voltage valley current – valley voltage negative resistance region – relaxation oscillator.

Unit 4 **(13 Hrs)**

Operational amplifier

4.1 Deferential amplifier – CMRR – operational amplifier- functional diagram – virtual ground – non inverting – inverting modes of operation – gain equation.

4.2 Operational amplifier application – adder- subtractor - scale and sign changer – differentiator – integrator – voltage follower.

4.3 Electronic analog computation – solution of simultaneous equations – differential equation.

Unit 5 **(8 Hrs)**

D/A and A/D converters

5.1 Weighted resistor D/A converter – R – 2R ladder D/A converter – parallel A/D converter

5.2 A/D conversion by counter method - A/D conversion using voltage to frequency converter.

BOOKS FOR STUDY

Floyd Thomas L., Digital Fundamentals , Universal Book Stall, New Delhi(1997).
Gayakwad, R.A, Op. Amps & Linear Integrated Circuits, Prentice Hall, New Delhi(1998).
Malvino Albert Paul, Electronic principles, Tata McGraw Hill Pub. Co. Ltd., New Delhi. (1984).
Malvino Albert Paul and Leach Donald, Digital Principles and Applications**,** Tata McGraw Hill Pub. Co. Ltd., New Delhi,(1981).

BOOKS FOR REFRENCE

Allen Mottershead, Electronic Devices and Circuits, Prentice Hall of India Pvt. Ltd., New Delhi(1982).
Ambrose A & T Vincent Devaraj, Elements of Solid State Electronics, Meera Publications, K.K. Dist(1990).
Milmann and Halkias, , Integrated Electronics, Tata McGraw Hill Pub. Co. Ltd., New Delhi(1992).
Sedha R.S, Applied Electronics, S Chand and Company, New Delhi (1997).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

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STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 600 086

B. Sc. DEGREE : BRANCH III - PHYSICS

SYLLABUS

(Effective from the academic year 2011 -2012)

NUCLEAR PHYSICS

CODE:11PH/MC/NP64 **CREDITS: 4**

L T P: 4 1 0

TOTAL TEACHING HOURS: 65

OBJECTIVES

- To understand and appreciate the concepts of Nuclear Physics
- To get in-depth knowledge of the phenomenon of radioactivity, nuclear energy and elementary particles.

Unit 1 **(13 Hrs)**

Nucleus

1.1 Nuclear density, binding energy per nucleon, packing fraction , nuclear stability,magnetic moment, nuclear radius- determination – nuclear charge- experimental determination, nuclear force, meson theory of nuclear force

1.2 Nuclear model, liquid drop model, semi empirical mass formula- shell model, magic numbers, evidence. (qualitative study only)

Unit 2 **(13 Hrs)**

Radioactivity

2.1 Decay constant, law of successive disintegration, radioactive equilibrium, ideal equilibrium – secular, and transient, radioactive series

2.2 Alpha decay- tunneling effect- range of alpha article- geiger nuttal law- fine structure, beta decay – k electron capture - fermi neutrino theory - beta energy spectrum, gamma decay – principles of internal conversion - interaction of gamma ray with matter, units of radioactivity, radiation effects

Unit 3 **(13 Hrs)**

Accelerators and detectors

3.1 Detectors : ionisation chamber, Geiger Muller counter – characteristics, scintillation counter, nuclear emulsion technique Accelerators : Van de Graff generator, linear accelerator, cyclotron, synchrotron, synchrocyclotron

Unit 4 **(13 Hrs)**

Nuclear Energy

4.1 Nuclear reactions – Q value, threshold value – endoergic reaction, artificial radioactivity, radioisotopes, uses

4.2 Nuclear fission – chain reaction – controlled and uncontrolled,

multiplication factor – four factor formula, power reactors, reactors in India, nuclear fusion, thermonuclear reaction, C- N cycle, proton - proton cycle, plasma

Unit 5 (13 Hrs)

Elementary Particles and Nuclear Resonance

5.1 Elementary particles, leptons, mesons, baryons, fundamental interactions, their strength, antiparticle, strange particles, quarks, conservation laws.

5.2 Nuclear resonance spectroscopy: NMR and NQR- introduction, experimental technique, applications (qualitative study only)

BOOKS FOR STUDY

Chang, Raymond, , Basic principles of Spectroscopy**,** McGraw Hill, New Delhi(1971).

Murugesan .R , Modern Physics**,** S. Chand and Company Ltd, New Delhi(2007).

BOOKS FOR REFERENCE

Beiser, Arthur Concepts of Modern Physics Tata Mcgraw Hill Publishing Company Limited – New Delhi(2004).

Gupta A. B. and Dipak Ghosh ,Atomic and Nuclear physics, Books and Allied Pvt. Ltd. Calcutta(1999).

Littlefield, T A and Thorley N, Atomic and Nuclear Physics – an Introduction, Van Nostrand Company, London(1979).

Rajam . J. B, Atomic Physics**,** S. Chand and Company Ltd, New Delhi(2000).

Ronald Gautreau and William Savin, Schaum's Series**,** Tata McGraw Hill Publishing Company Limited New Delhi(2004).

Sanjiv Puri, , Modern Physics – Concepts and Applications**,** Narosa Publishing House, New Delhi(2009).

Varma, Jagdish, Roopchand Bhandari, D. R. S Somayajulu Fundamentals of Nuclear Physics**,** CBS Publishing House (2005).

END SEMESTER EXAMINATION:

Total Marks: 100 Duration: 3 Hours

QUESTION PAPER PATTERN

Section A – 30 x 1 = 30 Marks (All questions to be answered) in 30 minutes
Multiple choice – 15, Fill in the blanks – 5, True or False – 5, Answer briefly – 5
Section B – 5 x 5 = 25 Marks (5 out of 7 to be answered (5 problems & 2 theory))
Section C – 3 x 15 = 45 Marks (3 out of 5 to be answered)