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. Degree Programmes

SYLLABUS
(Effective from the academic year 2015 – 2016)

BASICS OF COMMUNICATION SYSTEMS

CODE: 15PH/GE/BC23 **CREDITS: 3**
L T P: 3 0 0
TOTAL TEACHING HOURS: 39

OBJECTIVES OF THE COURSE

- To study the basic concepts of communication
- To understand the principles of optical and mobile Communications

Unit 1
Radiation Propagation **(8 hrs.)**
1.1 Fundamentals of Electromagnetic Waves – Propagation of Waves
1.2 Ground Waves – Sky Waves – Space Waves.

Unit 2
Communication Principles **(8 hrs.)**
2.1 Radio Broadcasting –Transmission and Reception – Demodulation
2.2 Types of Modulation – Amplitude Modulation – Frequency Modulation

Unit 3
RADAR systems **(11 hrs.)**
3.1 Radar Systems – Basic Principles– Block Diagram and Description
3.2 Radar Range Equation – Uses of Radar

Unit 4
Basics of Wireless Communication **(6 hrs.)**
4.1 Wireless Transmission: Introduction to Mobile Communications - Frequencies - Signals - Signal Propagation - Cellular Systems – GSM

Unit 5
Mobile Communications **(6hrs)**
5.1 Basic Functions in Mobile Systems - Location Management –Roaming

TEXT BOOKS

Ambrose, A., T. Vincent Devraj, *Elements of Solid State Electronics*. K.K. Dist: Meera, 1990.

Jochen Schiller, *Mobile Communications.* 2nd edition. New Delhi: Addison-Wesley, 2003.

Mehta. V.K., *Principles of Electronics.* New Delhi: S Chand, 1993.

Sarkar Subir Kumar, *Optical Fibres and Fibre Optic Communication Systems*. New Delhi: S Chand, 1997.

BOOKS FOR REFERENCE

Haykin, Simon, *Digital Communications*. New Delhi: John Wiley, 1998.

Kennedy, George, *Electronic Communication Systems.* New Delhi: Tata McGraw Hill, 1984.

Lathi B.P., *Communication System*, New Delhi: Wiley Eastern Limited, 1981.

PATTERN OF EVALUATION

No End Semester Examination

Continuous Assessment:

Total Marks: 50 Duration: 90 mins.

Section A – 5 x 3 = 15 Marks (All questions to be answered)
Section B – 4 x 5 = 20 Marks (4 out of 5 to be answered
Section C – 1 x 15 = 15 Marks (1 out of 2 to be answered)

Third Component :
List of Evaluation modes:
Seminars
Quiz
Group discussion
Assignments

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86

General Elective Course Offered by Department of Physics to
B A./ B.Sc (Other than Mathematics, Physics, Chemistry) / B.Com. / B.C.A. / B.S.W. Degree Programmes

SYLLABUS
(Effective from the academic year 2015 – 2016)

BASIC PRINCIPLES OF PHYSICS

CODE: 15PH/GE/BP22 **CREDITS: 2**
L T P: 1 0 1
TOTAL TEACHING HOURS: 26

OBJECTIVES OF THE COURSE

- To learn the basic concepts of physics
- To understand the principles of various machines through experiments

Unit 1

Mechanics (8 hrs.)

1.1 Newton's Laws of Motion- Conservation of Linear Momentum. Impulse- Collision- Centripetal and Centrifugal Forces –First and Second Order of Levers –Simple Machines

1.2.Experiments

I Conservation of Linear Momentum
II Centripetal and Centrifugal Forces
III Simple Machines

Unit 2

Optics (9 hrs.)

2.1 Light – Characteristics of Light- Reflection – Refraction – Interference – Diffraction - Polarization- Electromagnetic Spectrum- Microscope-Telescope-Spectrometer Laser- Stimulated Emission – Principle of Laser Action

2.2 Experiments

i. Parts of Optical Instruments
ii Study of Spectrum Using Prism and Transmission Grating
iii Determination of Thickness of Thin Wire Using LASER

Unit 3

Electricity (9 hrs.)

3.1 Ohm's Law- Resistance in Series and Parallel- Electromagnetic Induction- Lenz's Law- Magnetic Materials- Different Types of Magnetic Materials- DC and AC-Three Phase AC

3.2 Experiments

i. Verification of Ohm's Law
ii Study of Magnetic Properties
iii Generation of EMF Using Induction Coil

TEXT BOOK

Halliday,David and Robert Resnick. *Physics Vol I and I.* Chennai: New Age, 1995.

BOOKS FOR REFERENCE

Naranyanamurthi.M and Nagaratham.N. *Dynamic.* Chennai: The National, 1994.

Subrahmanyan. Nand Lal Brij. *Textbook of Optics*. New Delhi: Vikas, 2013.

Murugeshan R. *Electricity and Magnetism.* New Delhi: S Chand, 2013.

PATTERN OF EVALUATION
No End Semester Examination.

Continuous Assessment Test - I 25 Marks

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

Third Component: 25 Marks
List of Evaluation modes:
Seminar
Quiz
Open book tests
Assignment
Presentation of working model

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. Degree programmes
SYLLABUS
(Effective from the academic year 2015 – 2016)
DIGITAL PHOTOGRAPHY

CODE: 15PH/GE/DP23 **CREDITS: 3**
L T P: 2 0 1
TOTAL TEACHING HOURS: 39

OBJECTIVES OF THE COURSE

- To learn the basics of Photography and the different types of Camera Operations
- To have basic knowledge of Digital Photography
- To acquire basic skills in Adobe Photoshop

Unit 1 **(8 hrs.)**

Camera and Lighting

1.1 The History and Aesthetics of Photography – Components of Camera - Comparison Between Human Eye and Camera - Basics of Cameras and Art - Rules of Photography

1.2 Lighting: Front Lighting- Side Lighting-Back Lighting- Indoor Lighting-Available Light-Artificial Light-Using Flash-Bounce Flash-Fill in Flash

Unit 2

Digital Photography **(8 hrs.)**

2.1 Digital Cameras- Basics- Viewing and Focusing Systems- View Finder-Range Finder Lens: Wide Angle Lenses-Telephoto Lenses-Zoom Lenses-Mirror Lens

2.2 Shutters- Aperture- F-Number Scale F-Numbers and Exposure Time
Modes of Transferring Technique-Color Mixing-Resolution-Colour Saturation

Unit 3

Demonstration and Hands on Training Handling Camera **(11 hrs.)**

3.1 Handling Camera: DSLR - Controls - to Hold and Shoot, to Set Exposure, to Compose - Learning Different Shooting Modes

3.2 Creative Lighting - to Create a Mood with Lighting - Shooting Practice - Outdoor and Indoor

Unit 4

Demonstration and Hands-on Training - Photoshop Basics (6 hrs.)

4.1 Photoshop Tools and Palettes - Understand Managing Image Files - Saving, Uploading, Posting. – Image Editing, Layers and Filters in Photoshop.

Unit 5

Demonstration and Hands-on Training - Photoshop Images (6 hrs.)

5.1 Electronic Images - Their Scaling and Use: Imaging for the Internet - Gain Proficiency with Image Editing – File Size and Print Size.

TEXT BOOK

George T.Carver. & Eugene E.Lee. *Beginning Photography*. New Jersey: Prentice Hall, 1985.

BOOK FOR REFERENCE

Busch David D. *Digital Photography*. New Jersey: Prentice Hall, 2014.

PATTERN OF EVALUATION

No End Semester Examination

Continuous Assessment:

Total Marks: 50 Duration: 90 mins.

Section A – 5 x 3 = 15 Marks (All questions to be answered)

Section B – 4 x 5 = 20 Marks (4 out of 5 to be answered

Section C – 1 x 15 = 15 Marks (1 out of 2 to be answered)

Third Component:

List of Evaluation modes:

Scrap book

Portfolio

Assignments

Seminars

STELLA MARIS COLLEGE (AUTONOMOUS), CHENAI-600 086

B.Sc. DEGREE: BRANCH III – PHYSICS

General Elective Course Offered by Department of Physics to
B A./ B.Sc. / B.Com. / B.C.A. / B.S.W. Degree

SYLLABUS
(Effective from the academic year 2015 – 2016)

ENERGY PHYSICS

CODE: 15PH/GE/EP23 **CREDITS: 3**

L T P: 3 0 0

TOTAL TEACHING HOURS: 39

OBJECTIVES OF THE COURSE

- To understand various types of energy
- To stress the importance of conservation of energy and the need for alternate source of energy

Unit 1

Introduction **(9 hrs.)**

1.1 Energy : Sources of Energy - Forms of Energy- Potential , Kinetic, Mechanical, Chemical and Thermal Units of Energy, Uses of Energy, Energy Conversion

1.2 Non-Renewable Energy – Coal, Petroleum, Gas , Renewable Energy- Solar, Wind, Biomass, Geothermal and Nuclear , Advantages and Disadvantages

Unit 2

Non-Renewable Energy **(10 hrs.)**

2.1 Coal - Early Uses as Fuel,-Electricity Generation, Petroleum- Composition, Reservoirs – Uses

2.2 Natural Gas – Process, Conversion to Electrical Energy

Unit 3

Renewable Energy **(10 hrs.)**

3.1 Solar Energy- Solar Energy Conversion, Solar Pond, Solar Voltaic Cell Conversion, Wind Energy , Wind Mill Types , Geothermal- Power Plants, Uses of Geothermal Water

3.2 Biomass Energy – Biofuel Conversion Process, Gasification of Bio Mass, Nuclear: Nuclear Fission and Fusion, Power Reactors Hydroelectric Power, Principle - Production of Power

Unit 4

Energy and Environment **(5 hrs.)**

4.1 Energy and Environment, Conservation of Energy, Energy Consumption, Calorific Values of Energy

Unit 5

Energy Audit and Planning **(5 hrs.)**

5.1 Sustainable Energy Development, Present and Future, Need of Alternate Source of Energy.

5.2 Energy Audit

TEXT BOOK

Ashok V. Desai. *Non-conventional Energy.* New Delhi: New Age, 2001.

BOOKS FOR REFERENCE

Ashwin Paramar. *Energy Future,* New Delhi: Dominant, 2001.

Tiwari. G. N. and Ghosal M. K. *Renewable Energy resources.* New Delhi: Narosa, 2007.

Vandana. S. *Alternative Energy*. New Delhi: A P H, 2002.

PATTERN OF EVALUATION

No End Semester Examination.

Continuous Assessment:

Total Marks: 50 Duration: 90 mins.

Section A – 5 x 3 = 15 Marks (All questions to be answered)

Section B – 4 x 5 = 20 Marks (4 out of 5 to be answered

Section C – 1 x 15 = 15 Marks (1 out of 2 to be answered)

Third Component :

List of Evaluation modes:

Seminars

Quiz

Group discussion

Assignments

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. Degree Programmes

SYLLABUS
(Effective from the academic year 2015-2016)

HOME ELECTRICAL INSTALLATIONS

CODE: 15PH/GE/HE23 **CREDITS: 3**
L T P: 2 0 1
TOTAL TEACHING HOURS: 39

OBJECTIVES OF THE COURSE

- To understand the working principles of domestic electrical appliances
- To gain the ability to carry out simple electrical repair works

Unit 1 **(13 hrs.)**

Basic Electric Circuits

1.1 Basic Facts : Electric Circuits – Basic Components Used in an Electric Circuit –Complete Circuit- Lighting Circuits - Series and Parallel Circuits

1.2 Switches – Types of Switches – Plugs and Its Types – Safety Practices and Measurements

Unit 2 **(6 hrs.)**

Electrical Connections

2.1 Principles of Single Phase and Three Phase Connections. Fuses-Fuse Wire – Melting Point – Causes and Repairing a Fuse- the Earth Wire – Lightning Conductor

2.2 Using and Paying for Electricity- Consumption- KWH- Meters

Unit 3 **(7 hrs.)**

Home Appliances

3.1 Electric Iron – Heater- Microwave Oven- Incandescent and Fluorescent Lamps -CFL-Starter-Inverter- Electric Fan-Regulator (SCR)-Control Rheostat

3.2 Rice Cooker(Thermostat)-Voltage Stabilizer

Unit 4 **(7 hrs.)**

Demonstration and Hands-on Training-I

4.1. Experiments on Closed, Open, Short, Series and Parallel Circuits.

4.2. Wiring Practice of Switches and Plugs.

4.3. Measurement of Current and Voltage Using Multimeter.

Unit 5 **(6 hrs.)**

Demonstration and Hands-on Training-II

5.1 Replacing Fuses
5.2 A Model of House Wiring
5.3 Tubelight Connection

BOOKS FOR REFERENCE:

Bob Fairbrother. *Electricity in the Home.* New York: Bell and Bain, 1998.

Lindslaey Trevor. *Basic Electrical Installation Work.* Great Britain: Newnes, 2005.

PATTERN OF EVALUATION

No End Semester Examination

Continuous Assessment:

Total Marks: 50 Duration: 90 mins.

Section A – 5 x 3 = 15 Marks (All questions to be answered)
Section B – 4 x 5 = 20 Marks (4 out of 5 to be answered
Section C – 1 x 15 = 15 Marks (1 out of 2 to be answered)

Third Component:
List of Evaluation modes:
Presentation of working models
Assignments
Problem solving
Seminars

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. Degree Programmes
SYLLABUS
(Effective from the academic year 2015 – 2016)
PHYSICS OF MUSIC

CODE: 15PH/GE/PM22 **CREDITS: 2**
L T P: 2 0 0
TOTAL TEACHING HOURS: 26

OBJECTIVE OF THE COURSE

- To learn and appreciate the principles of sound behind music

Unit 1 **(8 hrs.)**

Introduction

1.1 Waves - Properties of Waves- Wave Motion- Sound Propagation- Echoes- Interference - Resonance and Beats

1.2 Sources of Sound- Sound Intensity and Loudness- Response of the Human Ear- Decibel Scale

Unit 2 **(9 hrs.)**

Elements of Music

2.1 Harmonic Series and Natural Modes; Steady Tones

2.2 Percussion Instruments- – Mirudangam-Drums- Natural Modes of Vibration - Standing Waves, Hammered and Plucked Strings- Bowed Strings- Violin, Veena and Guitar

Unit 3 **(9 hrs.)**

Flow-driven and Valve-driven Instruments

3.1 Tuning Temperaments

3.2 Flow-Driven Instruments - Valve-Driven Instruments; Pipe Organs.

TEXT BOOKS

Subramaniam N. and Brijlal. *Sound*. New Delhi: S Chand, 2000.

Thomas D. Rossing. *The Science of Sound*. Third Edition. New Delhi: Addison-Wesley, 2002.

John Backus. *The Acoustical Foundations of Music.* Second Edition. New York: Norton: 1977.

N.H. Fletcher and T.D. Rossing. *The Physics of Musical Instruments.* Second Edition. U.K: Springer.

BOOKS FOR REFERENCE

John R. Pierce. *The Science of Musical Sound*, Revised Edition. New York: Freeman, 1992.

John S. Rigden. *Physics and the Sound of Music.* New York: Freeman, 1984,

PATTERN OF EVALUATION

No End Semester Examination.

Continuous Assessment Test - I 25 Marks

Section A – 5 x 1 = 5 Marks (All questions to be answered)

Section B – 2 x 5 = 10 Marks (2 out of 3 to be answered

Section C – 1 x 10 = 10 Marks (1 out of 2 to be answered)

Third Component: 25 Marks

List of Evaluation modes:

Seminar

Quiz

Open book tests

Assignment