



KONGU ARTS AND SCIENCE COLLEGE

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)

ERODE – 638 107

PROGRAM NAME
B.Sc. (Physics)



KONGU ARTS AND SCIENCE COLLEGE

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2018-2019



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SYLLABUS

Sem.	Course Code	Electricity and Magnetism	Total Marks: 100		Hours Per Week	Credits
			CIA: 25	ESE: 75		
III	17UAOCT301				4	4

OBJECTIVES:

- To impart basic ideas of electric charge and current
- To develop fundamental knowledge in electricity and magnetism
- To understand the motion of charges in electric and magnetic fields

COURSE OUTCOMES:

At the end of the course, Students will be able to

CO1: Describe the behavior of charges at rest and the related terms

CO2: Understand the magnetic analogue of electrostatics

CO3: Apply the principles of thermoelectricity in real time situations

CO4: Gain knowledge in the field of current electricity and able to solve problems

CO5: Acquire ideas about motion of charges in various fields

UNIT I

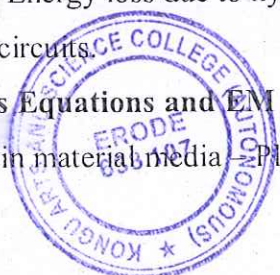
Electrostatics: Coulomb's law – Electric field – Electric field due to a point charge – Electric potential – Electric potential due to a point charge – Relation between them – Potential at a point due to a uniformly charged conducting sphere - Gauss's law and its application (Electric field due to uniformly charged sphere) – Electrical images – Poisson's and Laplace equation

Capacitors: Principle – Capacitance of a Capacitor – Spherical capacitor - Cylindrical capacitor – Parallel plate capacitor - Effect of a dielectric – Force of attraction between plates of a charged parallel plate capacitor.

UNIT II

Magnetostatics: Classification of magnetic materials – Properties of magnetic materials – Magnetic induction (B) – Magnetisation (M) – Magnetic field intensity (H) – Magnetic susceptibility (χ) and magnetic permeability (μ) – Relation between them – Antiferromagnetism and ferrimagnetism – Electron Theory of Magnetism - Experiment to draw M-H curve (Horizontal method) – Energy loss due to hysteresis – Determination of susceptibility: Curie Balance method - Magnetic circuits.

Maxwell's Equations and EM waves: Maxwell's equations – Displacement current – Maxwell's equations in material media – Plane Electromagnetic waves in free space.



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UNIT III

Thermo-electricity: Seeback effect – Laws of thermo e.m.f – Measurement of thermo e.m.f using potentiometer – Peltier effect – Thermodynamical consideration of Peltier effect – Thomson effect – Thomson coefficient – Thermodynamics of thermocouple – Thermoelectric diagrams and their uses – Boys Radio-micrometer – Thermo-electric Pyrometer - Thermopile.

UNIT IV

Current Electricity: Growth and decay of current in a circuit containing resistance & inductance – Charging and discharging of a capacitor through a resistor – A.C circuit containing resistance, inductance & capacitance in series – Parallel resonant circuit - Moving Coil Ballistic Galvanometer – Current and Voltage sensitivities – Measurement of absolute capacitance of a capacitor.

UNIT V

Motion of charged particle: Motion of charged particle in uniform electric field (longitudinal & transverse electric field) – Motion of charged particle in alternating electric field – Motion of charged particle in uniform constant magnetic field – Motion of charged particle in crossed electric and magnetic field.

Electromagnetic Induction: A conducting rod moving through a uniform magnetic field – Inductances in series – Inductances in parallel – Grassot Fluxmeter.

Text Book:

1. R. Murugesan – Electricity and Magnetism – Edition 2008 – S Chand & Co. Ltd., New Delhi.

Reference Books:

1. Electricity and Magnetism - Brijlal and N. Subramaniam — Edition 2000 - S Chand & Co. Ltd., New Delhi.
2. Electricity and Magnetism – Satya Prakash, Edition 2014 – Pragati Prakashan

QUESTION PAPER PATTERN

SECTION - A	SECTION - B	SECTION - C
10 x 1 = 10 Marks (Multiple Choice, Four options) Two questions from each unit	5 x 7 = 35 Marks (Either or choice) Two questions from each unit	3 x 10 = 30 Marks (Answer any three Questions) One Question from each unit



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Sem.	Course Code	NON - MAJOR ELECTIVE I	Total Marks: 75		Hours Per Week	Credits
			CIA: -	ESE: 75		
III	17UAONT304	Introduction to Electricity and Electronics			2	2

OBJECTIVES:

- To provide electronic fundamentals
- To develop curiosity in electronic circuits
- To introduce printed circuit boards and provide the basic ideas of soldering

COURSE OUTCOMES:

At the end of the course, Students will be able to

CO1: Gain the knowledge of basics of electricity

CO2: Understand and able to distinguish resistors based on colour code

CO3: Come to recognize protective and control circuits

CO4: Gain basic knowledge in the area of semiconductors

CO5: Construct simple electronic circuits

UNIT I

Electricity and Ohm's Law: Electric Field - Potential and Potential difference – Electric current – Unit of Electric Current - Difference between Electric Charge and Current – Electron Current and Conventional Current Flow – Electrical Resistance – Units of Electrical Resistance – Factors affecting Electrical Resistance – Effect of Temperature on Electrical Resistance – Temperature Coefficient of Electrical Resistance - Direct current and Alternating current- Comparison of D.C. Voltage and A.C. Voltage - Ohm's law.


UNIT II: Passive Circuit Elements:

Resistors – Classification of Resistors: Carbon Composition Resistors – Thin Film Resistors – Potentiometer – Thermistors and Photo Resistors - Color Code Resistance Designation.

Inductors - Inductance - Types of Inductors – Inductance of a Coil – Mutually Coupled Coils- Coil and Core Losses – Q-factor of an Inductor.

Capacitors - Capacitance – Factors Affecting Capacitance – Electrostatic and Electrolytic Capacitors




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UNIT III

Circuit Control and Protective Devices: Switch – Switching Actions – Types of Switches - Fuses – Fuse Ratings - Circuit Breaker – Printed circuit Board - Types of PCBs – Board Construction – Steps involved in the development of a PCB – Advantages of PCBs.

UNIT IV

Semiconductors: Classification of materials: Conductors, Insulators and Semiconductors – Types of Semiconductors – N type and P type Semiconductors (Basics only) – V-I Characteristics of p-n Junction Diode and p-n Junction Transistor.

UNIT V

Integrated Devices and Circuits: Introduction – Integrated Circuit – Advantages and Limitations of ICs - Scale of Integration – Classification of ICs by Structure – Comparison between Different ICs – Classification of ICs Function - Linear Integrated Circuits – Digital Integrated Circuits – IC Terminology – Semiconductors used in Fabrication of ICs and Devices – Fabrication of ICs : Material Preparation, Wafer Preparation, Wafer Fabrication and Testing , Bonding and Packaging – Popular Applications of ICs

Text Book:

1. R.S.Sedha – A Text book of Applied Electronics – Revised Edition 2006 – S.Chand & Company Ltd., NewDelhi

Reference Books:

1. Principles of Electronics - V. K. Mehta & Rohit Mehta - Revised Edition 2013 – S. Chand Publications, New Delhi.
2. Basic Electronics – B. L. Theraja – Recent Edition 2014 (Reprint 2015) – S. Chand Publications, New Delhi.

QUESTION PAPER PATTERN**SECTION - A**

(5 X 15 = 75 Marks)

(Either or Type)

Two questions from each unit



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Sem.	Course Code	Optics	Total Marks: 100		Hours Per Week	Credits
			CIA: 25	ESE: 75		
IV	17UAOCT401				4	4

OBJECTIVES:

- To provide fundamentals of optics
- To understand the concepts of Dispersion of Light, Interference, Diffraction and Polarization of Light

COURSE OUTCOMES:

At the end of the course, Students will be able to

CO1: Get an introduction to lens system and its role in modern era

CO2: Understand the types of aberrations

CO3: Get a thorough knowledge in the area of interference

CO4: Analyse the technique of diffraction and its requirement

CO5: Evaluate the process of polarisation

UNIT I

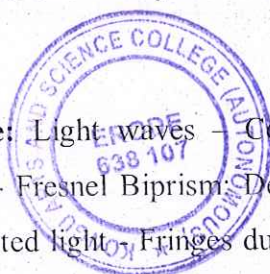
Lens : Properties of light: Laws of Reflection and Laws of Refraction – Fermat's Principle of least time - Lens Equation (Thin Lens) – Deviation by a thin lens - Equivalent focal length of two thin lenses – Cardinal Points – Principal points and Principal planes – Focal points and Focal planes – Nodal points and Nodal planes – Construction of the image using Cardinal points – Newton's Formula – Relationship between f_1 and f_2 – Relationship between f_1 , f_2 and μ_1 , μ_2 – Gaussian Formula.

UNIT II

Geometrical Optics: Dispersion by a prism – Refraction through a prism – Angular dispersion – Dispersive power – Deviation without dispersion – Dispersion without deviation – Lens aberrations – Spherical aberration – Coma – Astigmatism – Chromatic aberration - Chromatic aberration in a lens – Objective & Eyepiece – Huygens Eyepiece.

UNIT III

Interference: Light waves – Constructive & Destructive interference – Young's double slit experiment - Fresnel Biprism: Determination of wavelength of light - Interference in thin films due to reflected light. Fringes due to wedge-shaped thin film – Colours in thin films - Newton's rings: Determination of wavelength of monochromatic light – Refractive index of a liquid.



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UNIT IV

Diffraction: Fresnel & Fraunhofer diffraction – Zone plate – Action & Construction – Comparison with a convex lens – Fraunhofer diffraction at a circular aperture - Plane diffraction grating – Dispersive power of grating - Resolving power of a plane transmission grating.

UNIT V

Polarization: Plane polarized light – Circularly polarized light – Elliptically polarized light – Production & detection of plane polarized light – Production & detection of circularly polarized light - Production & detection of elliptically polarized light – Calcite crystal – Optic axis – Principal section – Principal plane – Nicol prism - Optical activity – Optical rotation – Specific rotation – Laurent's half shade polarimeter.

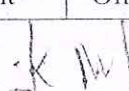
Text Book:

1. Brijlal and N. Subramaniam – A Text book of Optics – Revised Edition 2012 - S Chand & Co. Ltd.


Reference Books:

1. Optics & Spectroscopy – R. Murugesan - S Chand & Co. Ltd. - Edition 2010
2. Fundamentals of Molecular Spectroscopy – C. N. Banwell – Tata McGraw-Hill Co. – Edition 1972.

QUESTION PAPER PATTERN		
SECTION - A	SECTION - B	SECTION - C
10 x 1 = 10 Marks (Multiple Choice, Four options) Two questions from each unit	5 x 7 = 35 Marks (Either or choice) Two questions from each unit	3 x 10 = 30 Marks (Answer any three Questions) One Question from each unit


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Sem.	Course Code	NON - MAJOR ELECTIVE II	Total Marks: 75		Hours Per Week	Credits
IV	17UAONT405	Electrical and Electronic Appliances	CIA: -	ESE: 75	2	2

OBJECTIVES:

- To provide the knowledge of electric power generation
- To introduce the principles underlying the electrical and electronic gadgets

COURSE OUTCOMES:

At the end of the course, Students will be able to

CO1: Recollect the conventional sources of electric power generation

CO2: Comprehend the working principles of lighting and heating

CO3: Analyze the working of everyday home appliances

CO4: Broaden their knowledge in the field of electronics

CO5: Acquire scientific outlook in exploring things

UNIT I

Introduction to Electrical Energy Generation: Preference for Electricity - Sources for Generation of Electricity - Brief Aspects of Electrical Energy Systems - Conventional Sources of Electrical Energy : Steam Power Stations (Coal-fired), Nuclear Power Stations and Hydroelectric Generation

UNIT II

Lighting & Heating Appliances: Incandescent Lamps – Fluorescent Lamps - CFL – LED Lamps - Electric Iron - Microwave Oven

UNIT III

Modern Home Appliances: Refrigerator – Air Conditioner –Washing Machine – Colour Television – UPS - Inverter

UNIT IV

Commercial Electronics: FAX – Xerography - Calculator - Automated Teller Machines (ATM) - Bar Codes



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UNIT V

Mobile Electronics: Optical mouse –Touch Screen Mobile – Bluetooth – Difference between Dial up and broadband internet connections – Functioning of Sim card in mobile phones – GPS

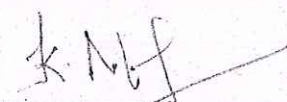
Text Books:

1. B.L.Theraja & A.K.Theraja - A Text Book Of Electrical Technology Volume I - Edition 2005 – S.Chand Publications (UNIT I)
2. Study Material by Department of Physics (UNIT II)
3. S. P. Bali - Consumer Electronics – Edition 2008 - Pearson Education Pvt Ltd – (UNIT III, IV)
4. Hindu speaks on Scientific Facts – Volume I & II – Edition 2006 (UNIT V)
5. Hindu speaks on Scientific Facts – Volume III - Edition 2015 (UNIT V)


Reference Books:

1. Principles of Electronics - V. K. Mehta & Rohit Mehta - Revised Edition 2013 - S. Chand Publications, New Delhi.
2. Basics Electronics (Solid State) – B. L. Theraja - S. Chand Publications, NewDelhi.
3. Consumer Electronics – Dr.B.R.Gupta & V.Singhal , 6th Edition 2013 - S.K.Kataria & Sons publishers

QUESTION PAPER PATTERN
SECTION - A
(5 X 15 = 75 Marks) (Any five out of ten) Two questions from each unit


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ACTIVITIES



KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

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DEPARTMENT OF PHYSICS

Skill Development Training on

“Basic Lab Equipments”- 25.06.2018

KONGU
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DEPARTMENT OF PHYSICS

Cordially invite you all for the
SKILL DEVELOPMENT TRAINING
ON
“BASIC LAB EQUIPMENTS”

Presidential Address
Thiru.A.K.ilango
Correspondent

Felicitation
Dr.N.Raman
Principal

Participants:III B.Sc Physics students
venue : Physic laboratory

DATE: 25.06.2018 **TIME: 9.30 AM**

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Advancing the Best

A Skill Development Training on “Basic Lab Equipments” was organized by the Department of Physics. During the training, faculty members trained the students on the principles of basic lab equipments. Students were taught about the proper handling of instruments like CRO, IC regulated power supply, Function generator, etc., 52 III Year UG students gained practical comprehension on Physics Laboratory Equipments.



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DEPARTMENT OF PHYSICS

Inauguration of Vibrant Association Activities for the year 2018-2019

KONGU ARTS AND SCIENCE COLLEGE
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ERODE

DEPARTMENT OF PHYSICS
Cordially invite you all for the
Inauguration of
VIBRANT Association Activities

Presidential Address
Thiru.A.K.Ilango
Correspondent

Felicitaton
Dr.N.Raman
Principal

Chief Guest
Dr.L.Usha
Former Associate Professor & Head
Department of Physics
Vellalar College for Women (Autonomous)
Erode

Participants : Physics students
VENUE :PG SEMINAR HALL
27th July 2018 Time: 10.00 Am

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Inauguration of Physics VIBRANT association activities for the academic year 2018-2019 was inaugurated by Dr.L.Usha, Former Professor & Head, Department of Physics, Vellalar College for Women (Autonomous), Erode on 27.07.2018. A special lecture was delivered on “Bioluminescence” for our B.Sc., Physics students (148 students). The Students were taught about the current trends in this Bioluminescence area. Resource person explained the concept of Bioluminescence which is emitted by marine organism. Students were exposed to the new area of Physics. Also, they were made to surf and know chemiluminescence. Further the students were motivated for higher studies.



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