



# **KONGU ARTS AND SCIENCE COLLEGE**

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

**ERODE – 638 107**

**B.Sc (Physics)**



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**2020-2021**



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# **SYLLABUS**

Sem.	Course Code	Electricity and Magnetism	Total Marks: 100		Hours Per Week	Credits
			CIA: 25	ESE: 75		
III	19UAOCT301*				4	4

**OBJECTIVE:**

- 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 recollect the types of capacitors

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) – Poisson's and Laplace equation

**Capacitors:** Introduction – Spherical capacitor - Cylindrical capacitor – Parallel plate capacitor - Effect of a dielectric – Force of attraction between plates of a charged parallel plate capacitor

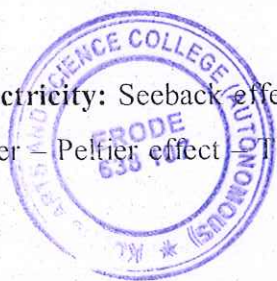
**UNIT II**

**Magnetostatics:** Magnetic induction (B) – Magnetisation (M) – Magnetic field intensity (H) – Relation between B, H and M – Magnetic susceptibility ( $\chi$ ) and magnetic permeability ( $\mu$ ) – Properties of dia, para and ferro magnetic materials - 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.

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

**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 and Thomson effect



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– 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 – Comparison between series and parallel Resonant circuit – Wattless current - 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 – Self- inductance of co-axial cylinders - Grassot Fluxmeter.

#### Text Book:

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	SKILL BASED COURSE Scientific Facts I	Total Marks: 75		Hours Per Week	Credits
III	19UAOST303*			CIA: 20	ESE: 55	3

**OBJECTIVES:**

- To impart Scientific cognizance
- To develop curiosity in Science
- To embark on pursuing scientific enquiries as a hobby

**COURSE OUTCOMES:**

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

CO1: Explore current environmental problems

CO2: Comprehend natural phenomena, everyday experiences and consequences

CO3: Relate science principles to hydrology

CO4: Describe the behaviour of stellar bodies

CO5: Acquire scientific temperament in exploring things

**UNIT I**

**Atmosphere:** Cosmic rays – Aurora Polaris - Holes in the Ozone layer – Chlorofluorocarbons (CFC) damage – Euro norms – Solar wind – Acid rain – Nuclear winter

**UNIT II**

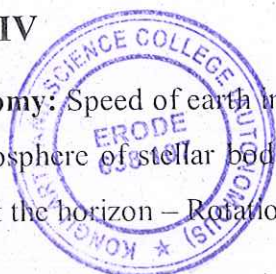
**Geology:** Elliptical orbit of Planets – Two high tides in each day – Sea shore – Depth of Ocean – Lava flowing out of a Volcano – Colour of clothing in hot weather – Lighting arrestor – Black rain clouds – Cooling of fingers in winter season – East coast more often affected than west coast – Rainbows – Determination of latitude and longitude of a given place on earth


**UNIT III**

**Hydrology:** Water stored in mud pot – Colour of waterfall – Quantity of water in dams & reservoirs – Transparency of water - Difference between ultra-filtration and R.O in water purification – Dance of water droplets on a hot plate – Purity of mineral water – Spherical shape of water drops – Energy from tidal waves

**UNIT IV**

**Astronomy:** Speed of earth in space – Solar eclipse & naked eye – Eclipse of the moon in day light – Atmosphere of stellar bodies – Blue moon – Earthquake on the moon – Moon and sun appear larger at the horizon – Rotation of sun



  
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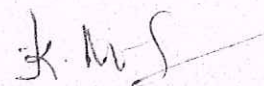
**UNIT V**

**Applied Science:** Refrigerator – Air Conditioner & Air Cooler – Spark generation from a gas stove lighter – Necessity of switching off mobiles in airplane - Black box in planes – Speech Synthesizer – Lie detector – Unleaded petroleum two wheeler – Mixing of oil with petrol for four wheelers – Technology behind mono rail

**Text Books:**


1. The Hindu Speaks on Scientific Facts – Volume I & II - Edition 2006.
2. The Hindu Speaks on Scientific Facts – Volume III – Edition 2015.

QUESTION PAPER PATTERN		
SECTION - A	SECTION - B	SECTION - C
<b>10 x 1 = 10 Marks</b> (Multiple Choice, Four options) Two questions from each unit	<b>5 x 3 = 15 Marks</b> (Either or choice) Two questions from each unit	<b>3 x 10 = 30 Marks</b> (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	19UAONT304*	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**

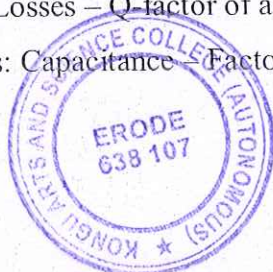
**Electricity and Ohm's Law:** Electric Field - Potential and Potential difference – Electric current – Unit of Electric Current - Difference between Electric Charge and Current – Electron Current and Conventional Current Flow – Electrical Resistance – Units of Electrical Resistance – Factors affecting 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 – 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 – Zener diode (V-I Characteristics) - UJT.

### UNIT V

**Integrated Devices and Circuits:** Introduction – Integrated Circuit – Advantages and Limitations of ICs - Scale of Integration – Classification of ICs Function - Linear Integrated Circuits – Digital Integrated Circuits – IC Terminology – Semiconductors used in Fabrication of ICs and Devices – comparison of ICs based on MOS and Bipolar transistor technology – 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.

<b>QUESTION PAPER PATTERN</b>
<b>SECTION - A</b>
(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	19UAOCT401*				4	4

**OBJECTIVES:**

- To provide fundamentals of optics
- To understand the concepts of Dispersion, 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 techniques of diffraction and its requirement

CO5: Evaluate the process of polarization

**UNIT I**

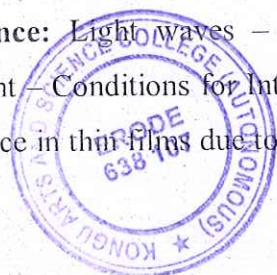
**Lens :** Properties of light: Laws of Reflection and Laws of Refraction – Fermat’s Principle of least time - Lens Equation (Thin Lens) – Deviation by a thin lens - Equivalent focal length of two thin lenses – Cardinal Points – Principal points and Principal planes – Focal points and Focal planes – 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  $\mu_1$ ,  $\mu_2$  – Gaussian Formula.


**UNIT II**

**Geometrical Optics:** Dispersion by a prism – Refraction through a prism – Angular dispersion – Dispersive power – Achromatic combination of prisms: 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 – Conditions for Interference - Fresnel Biprism: Determination of wavelength of light - Interference in thin films due to reflected light - Fringes due to wedge-shaped thin film – Colours in



  
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thin films - Newton's rings: Determination of wavelength of monochromatic light – Refractive index of a liquid

#### UNIT IV

**Diffraction:** Rectilinear Propagation of light - Zone plate – Action & Construction – Comparison with a convex lens – Distinction between Interference and Diffraction - Fresnel & Fraunhofer diffraction at a circular aperture - Plane diffraction grating – Dispersive power of grating - Resolving power of a plane transmission grating

#### UNIT V

**Polarization:** Introduction - Types of Polarization: Plane polarized light – Circularly polarized light – Elliptically polarized light – Partially polarized light – Polarizer and Analyzer - 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

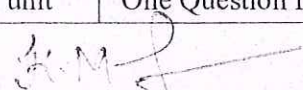
#### Text Book:

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		
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Sem.	Course Code	Core Practical – II	Total Marks: 100		Hours Per Week	Credits
			CIA: 40	ESE: 60	2	4
IV	19UAOCP402*					

**OBJECTIVES:**

- To train the students on measurements and instruments
- To strengthen the understanding of theoretical knowledge

**COURSE OUTCOMES:**

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

CO1: Explore the principle of electromagnetic induction

CO2: Recognize the relation between theory and experiment

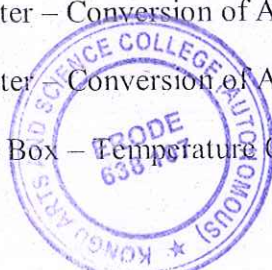
CO3: Apply the knowledge of electricity in the calibration of meters


CO4: Correlate the principles of interference to experimental situations

CO5: Evaluate diffraction principles by spectrometer

**(EXAMINATION AT THE END OF FOURTH SEMESTER)****Any 12 Experiments Only**

1. Field along the axis of a coil – Deflection Magnetometer
2. Moment of a magnet – Tan C position
3. Moment of the bar magnet – Circular coil apparatus
4. Ballistic Galvanometer – Figure of Merit
5. Ballistic Galvanometer – Absolute Capacitance of a Capacitor
6. Potentiometer – Calibration of Low range Voltmeter
7. Potentiometer – Calibration of Low range Ammeter
8. Potentiometer – Specific Resistance of a wire
9. Potentiometer – Comparison of EMF
10. Galvanometer – Conversion of Ammeter
11. Galvanometer – Conversion of Ammeter
12. Post Office Box – Temperature Co-efficient of Resistance of a Thermistor




  
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13. Metre Bridge – Specific Resistance
14. Carey Foster's Bridge – Specific Resistance
15. Air Wedge – Thickness of a wire
16. Spectrometer – Hollow Prism – Refractive index of a liquid
17. Spectrometer – Solar Spectrum
18. Newton's Ring – Refractive Index of a Lens


### Demonstration

1. Hall effect – Determination of Hall coefficients
2. Multimeter – i) Ammeter, Voltmeter and Ohm meter  
ii) Verification of Electronic components

Parameters	Maximum Marks
Record Note book	05
Formula Used and Circuit diagram (if applicable)	15
Tabulation	15
Observation	15
Calculation	05
Result	05
<b>Total</b>	<b>60</b>

  
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Sem.	Course Code	SKILL BASED COURSE	Total Marks: 75		Hours Per Week	Credits
			CIA: 20	ESE: 55		
IV	19UAOST404*	Scientific Facts II			3	3

**OBJECTIVES:**

- To impart Scientific cognizance
- To develop curiosity in Science
- To embark on pursuing scientific enquiries as a hobby

**COURSE OUTCOMES:**

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

CO1: Understand the science principles involved in everyday appliances

CO2: Exposed to the working principles of home appliances

CO3: Apply physics knowledge to understand the phenomenon of light

CO4: Recognize the physics behind modern appliances

CO5: Gain exposure in the area of data transmitting devices and automobile

**UNIT I**

Automatic Wrist watches – Microwave Oven – Induction stove - Pressure Cooker – Richter scale – Thermo Flasks – Acids in batteries - Leak proof battery

Passage of electric current through wire – Copper for electromagnets – Tarnishing of Silver – Plexiglas

**UNIT II**

Electronic Weighing machine - Three pin electrical plugs – Functioning of thermostat - Humming sound in tension wires – Electric line tester – Production of electricity from nuclear materials - Electric train – Hot air balloons

**UNIT III**

Curved fan wings – Table fan – Street lights & Head lights – Fluorescent lamps – Sodium vapour lamps in streets – Low pressure and high pressure sodium vapour lamp

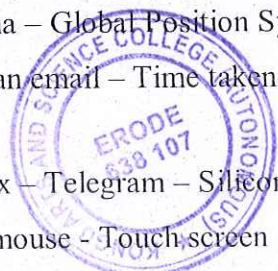
**UNIT IV**

Photograph of a Television Picture – Colour TV screen – Remote control – Photocopier – TV antenna – Global Position System – Difference of dial up and broadband internet connections – Origin of an email – Time taken for copying and deleting a file in the computer

**UNIT V**

Fax – Telegram – Silicon in electronics - Sim card function in a cell phone - Optical mouse - Wireless mouse - Touch screen

Exhaust silencer – Speedometer - Helicopters - RADAR – SONAR – (Magnetic Levitation)

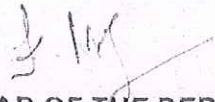


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**Text Books:**

1. The Hindu Speaks on Scientific Facts – Volume I & II - Edition 2006.
2. The Hindu Speaks on Scientific Facts – Volume III – Edition 2015.

QUESTION PAPER PATTERN		
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<b>10 x 1 = 10 Marks</b> (Multiple Choice, Four options) Two questions from each unit	<b>5 x 3 = 15 Marks</b> (Either or choice) Two questions from each unit	<b>3 x 10 = 30 Marks</b> (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
			CIA: -	ESE: 75		
IV	19UAONT405*	Electrical and Electronic Appliances			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 – Vehicle head lights - Electric Iron - Microwave Oven – Induction Stove - Electric water heater.

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

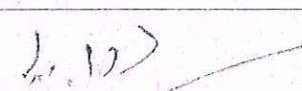
### Text Books:

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 , 6<sup>th</sup> Edition 2013 - S.K.Kataria & Sons publishers

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

  
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Sem.	Course Code	Mathematical Physics	Total Marks: 100		Hours Per Week	Credits
			CIA: 25	ESE: 75	5	4
V	20UAOCT501					

### OBJECTIVES

- To impart mathematical knowledge for the description of Physical Phenomenon
- To develop the problem solving ability

### COURSE OUTCOMES:

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

- CO1: Correlate the principles of curl and divergence in practical applications
- CO2: Understand the concept of different coordinate systems
- CO3: Gain insight over the requirement of matrices
- CO4: Develop their views in Newtonian mechanics
- CO5: Evaluate the applications of Hamiltonian formalism

### UNIT I:

**Vector Calculus:** Gradient of a Scalar Field – Line, Surface and Volume Integrals – Divergence of a Vector Function – Curl of a Vector Function – Important Vector Identities – Gauss’s Divergence theorem – Stoke’s theorem

### UNIT II:

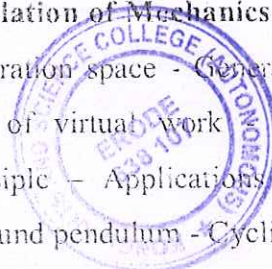
**Curvilinear Co-ordinates:** Orthogonal Curvilinear Co-ordinates – Differential Operators in terms of Orthogonal Curvilinear Co-ordinates – Spherical Polar Co-ordinates ( $r, \theta, \phi$ ) and Differential Operators – Cylindrical Co-ordinates and Differential Operators

### UNIT III:

**Matrices:** Introduction – Special types of Matrices – Transpose of a Matrix – The Conjugate of a Matrix – The Conjugate Transpose of a Matrix – Symmetric and Asymmetric Matrices – Hermitian and Skew Hermitian Matrices – Orthogonal, Unitary Matrices and their Properties (Theorem 2.5 & 2.6) – Eigen Values and Eigen Vectors – Cayley Hamilton Theorem

### UNIT IV:

**Lagrangian Formulation of Mechanics:** Constraints – Generalised co-ordinates – Transformation equations – configuration space - Generalised displacement, Velocity, Acceleration, Momentum, Force – Principle of virtual work – D’Alembert’s Principle – Lagrange’s equations from D’Alembert’s Principle – Applications of Lagrange’s equations: simple pendulum, Atwood’s machine and compound pendulum - Cyclic coordinates.



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**UNIT V:**

**Hamiltonian Formulation of Mechanics:** Phase space – Hamiltonian function – Hamilton's equations – Physical Significance of Hamiltonian function – Applications of Hamilton's equations: Simple Pendulum, compound pendulum and Linear Harmonic Oscillator – Principle of Least Action.

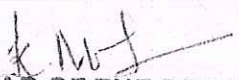
**Text Books:**

1. Sathya Prakash – Mathematical Physics with Classical Mechanics – Fifth Revised Edition 2006 – Sultan Chand & Sons Educating Publishers, New Delhi.(UNIT I to IV)
2. Gupta, Kumar and Sharma – Classical Mechanics – Twenty sixth Edition 2013 Reprint 2014 - Pragati Prakashan Publications, Meerut. (UNIT V)


**Reference Books:**

1. Mathematical Physics – Dr. B. S. Rajput – 27<sup>th</sup> Edition 2014 – Pragati Prakashan Publications
2. Mathematical Physics – H. K. Dass & Dr. Rama Verma – 7<sup>th</sup> Revised Edition 2014 – S. Chand Publications
3. Mathematical Physics – P. K. Chattopadhyay – 2<sup>nd</sup> Edition 2013 Reprint 2018 – New Age International Publishers
4. Mathematical Physics – B. D. Gupta — 4<sup>th</sup> Edition 2010 First Reprint 2016 – Vikas Publishing House Pvt. Ltd.,

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

  
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Sem.	Course Code	Quantum Mechanics and Relativity	Total Marks: 100		Hours Per Week	Credits
			CIA: 25	ESE: 75		
V	20UAOCT502				5	4

### OBJECTIVES

- To provide an introduction to Quantum Mechanics
- To apply the principles of Quantum concepts to calculate observables on known Wave Functions.

### COURSE OUTCOMES:

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

- CO1: Recollect the basic principles of wave mechanics
- CO2: Understand the validation of Schrodinger's equation
- CO3: Exposed to commutation algebra
- CO4: Analyse the differences between special and general theory of relativity
- CO5: Evaluate the underlying principles of general theory of relativity

### UNIT I:

**Wave Mechanics:** The de-Broglie wavelength – Phase Velocity of de-Broglie waves – Group Velocity of de-Broglie waves – Relation between Group Velocity and Phase Velocity – Davisson and Germer's Experiment – G. P. Thomson's Experiment – Heisenberg's Uncertainty Principle.

### UNIT II:

**Schrodinger's Wave Equation:** Basic Postulates of Wave Mechanics – Derivation of Time-dependent form of Schrodinger equation – Schrodinger's equation: Steady-state form – Properties of the wave function – Orthogonality of Eigen Functions: Proof of energy Eigen values are real and two eigen functions corresponding to different eigen values are orthogaonal to each other  
**Applications of Schrodinger's Equation:** Particle in a one dimensional box – Potential step – The Barrier Penetration problem – Linear Harmonic Oscillator.

### UNIT III:

**Commutation Algebra:** Commutation relation between Position and Momentum, H and p, components of L and  $L^2$  – Ladder Operator  $L_+$  and  $L_-$  - Commutation relation of orbital angular momentum with position – Hermitian operator – Properties of Hermitian operators.

**Total Angular Momentum:** Commutation relation between Square of the Total Angular Momentum and its Components – Commutation rule for the Components of Generalised Angular Momentum Operator – Ladder Operators  $J_-$  &  $J_+$ .



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#### UNIT IV:

**Special Theory of Relativity:** Frame of Reference – Newtonian Relativity – Galilean Transformation equations – The Ether Hypothesis – The Michelson-Morley Experiment and explanation of the negative result – Postulates of Special Theory of Relativity – The Lorentz Transformation equations – Length Contraction – Time Dilation.

#### UNIT V:

**General Theory of Relativity:** Variation of Mass with Velocity - Mass Energy Equivalence - Minkowski's Four Dimensional Space-Time Continuum – Postulates of General theory of Relativity.

**The Photon:** Photons and Gravity - Gravitational Red Shift - Black Hole.

#### Text Book:

R. Murugesan & Er. Kiruthiga Sivaprasath – Modern Physics – Revised Edition 2015 – S. Chand Publications, New Delhi.

#### Reference Books:

1. Advanced Quantum Mechanics – Sathyaprakash – Fifth Revised and Enlarged Edition – Reprint 2014 – Kedar Nath, Ram Nath Publications, Meerut.
2. Elements of Quantum Mechanics – Kamal Singh, S.P.Singh – First Edition 2005 – Reprint 2013 – S. Chand Publications, New Delhi.
3. Quantum Mechanics – Leonard I. Schiff – Third Revised Edition 2010 – Tata Mc Graw Hill Publishing Pvt. Ltd.
4. A Text book of Quantum Mechanics – P.M. Mathews & K. Venkatesan – Second Revised Edition 2010 – Mc Graw Hill Publishing Pvt. Ltd

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	Atomic Physics and Spectroscopy	Total Marks: 100		Hours Per Week	Credits
			CIA: 25	ESE: 75	4	4
V	20UAOCT503					

### OBJECTIVES

- To impart the knowledge in the Structure of Atom and Atom Models
- To understand the concept of Quantum Numbers

### COURSE OUTCOMES:

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

- CO1: Recognize cathode rays, positive rays and atomic models
- CO2: Infer the basic ideas of quantum numbers and spatial quantization
- CO3: Implement the application of X-rays in determining the crystal structures
- CO4: Comprehend various photoelectric cells
- CO5: Evaluate the influence of electric and magnetic field in spectral line splitting

### UNIT I:

**Cathode Rays:** Properties - Charge of Electron by Millikan's Oil Drop method – Dunnington's method for determining  $e/m$ .

**Positive Rays:** Discovery – Properties – Thomson's Parabola method – Bainbridge's Mass Spectrograph.

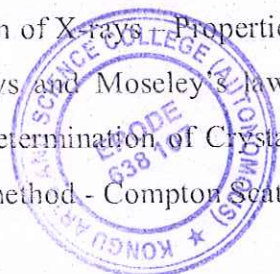
**Structure of the Atom:** Bohr Atom Model – Effect of Nuclear motion on Atomic Spectra – Evidences in favour of Bohr's Theory - Critical Potentials – Atomic Excitation – Franck and Hertz's method – Davis and Goucher's method – Sommerfeld's Relativistic Atom Model

### UNIT II:

**Vector Atom Model:** Introduction – Spatial Quantisation and Spinning Electron - Quantum Numbers associated with the Vector Atom Model – Coupling Schemes – The Pauli Exclusion Principle – Magnetic Dipole Moment due to Orbital Motion of the Electron – Magnetic Dipole Moment due to Spin – Stern and Gerlach Experiment

### UNIT III:

**X-rays:** Production of X-rays - Properties of X-rays – Continuous and Characteristic X-ray Spectra – Origin of X-rays and Moseley's law – Absorption of X-rays - Bragg's law – Bragg X-ray Spectrometer – Determination of Crystal Structure by Powder Crystal method, Lame method and Rotating Crystal method - Compton Scattering.



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**UNIT IV:**

**Photoelectric Effect:** Introduction – Lenard’s method to determine  $e/m$  for photoelectrons – Richardson and Compton Experiment – Laws of Photoelectric Emission – Einstein’s Photoelectric Equation – Experimental Verification by Millikan’s Experiment – Photoelectric Cells: Photo-emissive cell – Photo-voltaic cell – Photoconductive cell – Applications of Photoelectric cells.

**UNIT V:**

**Molecular Spectroscopy:** Raman effect – Experimental study of Raman effect – Quantum theory of Raman effect - Applications of Raman effect –Zeeman effect – Normal Zeeman effect – Lorentz theory of normal Zeeman effect – Anomalous Zeeman effect –Paschen-Back effect – Stark effect.

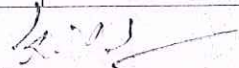
**Text Books:**

1. J. B. Rajam – Atomic Physics – Edition 2004 Reprint 2007 - Sultan Chand Publications, New Delhi. (UNIT I: Chapter 1)
2. R. Murugesan & Er. Kiruthiga Sivaprasath – Modern Physics – Revised Edition 2015 – S. Chand Publications, New Delhi. (UNIT I to V)


**Reference Books:**

1. Fundamentals of Modern Physics – Agarwal & Agarwal – 7<sup>th</sup> Revised Edition 2013 - Pragati Prakashan Publications, Meerut.
2. Atomic and Nuclear Physics – N. Subramaniam and Brijlal – Edition 2007 - Sultan Chand Publications, New Delhi.
3. Modern Physics – G. Aruldas and P. Rajagopal – Revised Edition 2005 - Prentice-Hall of India
4. Fundamentals of Molecular Spectroscopy – Colin N. Banwell and Elaine M. McCash – 4<sup>th</sup> Edition 2016 – Mc Graw Hill Education Publishers

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

  
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Sem.	Course Code	Solid State Physics	Total Marks: 100		Hours Per Week	Credits
VI	20UAOCT601		CIA: 25	ESE: 75	5	4

### OBJECTIVES

- To gain the knowledge of Crystallography which is required to understand Mechanical, Optical and Electrical Properties of Solids
- To acquaint with the up-to-date status of phenomena in Solids and to offer a broadening knowledge in Solid State Electronics

### COURSE OUTCOMES:

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

- CO1: Evoke the basics of crystal systems
- CO2: Understand the types of defects in crystals
- CO3: Apply the knowledge of magnetic properties in different theories of magnetism
- CO4: Expand the views in the phenomenon of superconductivity
- CO5: Evaluate the principles of optoelectronic devices

### UNIT I:

**Crystal Structure:** Introduction - Lattice points and space lattice – Basis and crystal structure – Unit cells and lattice parameters – Crystal systems – Bravais Lattices - Metallic crystal structures: SC, BCC, FCC – HCP structure – Miller indices – important features of Miller indices

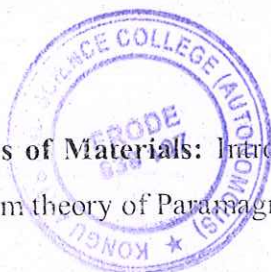
**Imperfections in Crystals:** Point Defects: Vacancies – Interstitialcies – Impurities – Electronic Defects (Derivation for number of Schottky and Frenkel defects – not necessary) - Line Defects: Edge Dislocation and Screw Dislocation - Surface Defects: External Surface Imperfections – Internal Surface Imperfections.

### UNIT II:

**Superconductivity:** Introduction – Properties of Superconductors – Classification of Superconductors – BCS theory of superconductivity – London Equation – High  $T_c$  Superconductors – Josephson Effect : Theory of DC & AC Josephson Effect - Applications – Squid, Cryotron, Magnetic Levitation

### UNIT III:

**Magnetic Properties of Materials:** Introduction – Langevin's theory of Diamagnetism and Paramagnetism – Quantum theory of Paramagnetism – Cooling by Adiabatic Demagnetization of a



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Paramagnetic Salt – Ferromagnetism – Domain theory of Ferro magnetism – Soft and Hard magnetic materials - Weiss theory of Ferromagnetism

**UNIT IV:**

**Dielectrics:** Introduction – Different types of electric polarisation: Electronic, Ionic, Orientation and Space-charge Polarization – Frequency dependence of Polarizability - Lorentz method for finding the internal field for a cubic structure - Clausius – Mosotti relation – Dielectric Loss – Determination of dielectric constant of a dielectric material – Dielectric breakdown – Properties and applications of different types of insulating materials

**UNIT V:**

**Optoelectronic Devices:** Light Emitting Diode (LED) – Photoconductors - Photo Diode – Photo Transistor - Liquid Crystal Display (LCD) - Solar Cell

**New Materials:** Metallic Glasses – Fiber reinforced Plastics and Fiber Reinforced Metals – Biomaterials – High Temperature Materials – SMART Materials.

**Text Books:**

1. S. O. Pillai – Solid State Physics – Eighth Edition 2018 - New Age International Publishers (UNIT I: Chapter 4)
2. R. Murugesan & Er. Kiruthiga Sivaprasath – Modern Physics – Eighteenth Edition 2016 – S Chand Publications, New Delhi. (UNIT II to V)
3. Dr. M. Arumugam – Materials Science – Third Revised Edition 2002 Reprint 2016 – Anuradha Agencies Publishers (UNIT V- Chapter 11 - New Materials)

**Reference Books:**

1. Solid State Physics - Gupta. Kumar – 9<sup>th</sup> Revised Edition 2016 – K. Nath & Co., Meerut
2. Introduction to Solid State Physics - Charles Kittel - 8<sup>th</sup> Edition 2004 Reprint 2013 – Wiley India Pvt. Ltd.
3. Elements of Solid State Physics - J.P. Srivastava – 2<sup>nd</sup> Edition 2006 – Prentice-Hall of India.

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



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Sem.	Course Code	Nuclear Physics	Total Marks: 100		Hours Per Week	Credits
VI	20UAOCT602		CIA: 25	ESE: 75	5	4

## OBJECTIVES

- To impart basic concepts of Nuclear Physics with emphasis on Nuclear Structure and Interactions of Radiation with Matter.
- To introduce the fundamental principles that highlight Detectors, Accelerators, Fission and Fusion.

## COURSE OUTCOMES:

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

- CO1: Recall the basics of nuclei and study the models of nuclear structure
- CO2: Understand the mechanism of accelerators
- CO3: Aware the meaning of radioactivity and understand its origin
- CO4: Expand the views in discriminating fission and fusion
- CO5: Assess the origin of elementary particles

## UNIT I:

**Introduction to Nucleus:** Introduction – Classification of Nuclei – General Properties of Nucleus – Binding Energy – Nuclear Stability – Nuclear Forces – Meson theory of Nuclear Forces.

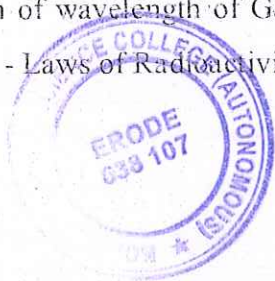
**Models of Nuclear Structure:** The Liquid Drop Model - The Shell Model – The Collective Model.

## UNIT II:

**Detectors and Particle Accelerators:** Introduction - Ionization Chamber – Solid State Detectors – Proportional Counter – Geiger-Muller Counter – The Wilson Cloud Chamber – Bubble Chamber – Scintillation Counter – The Linear Accelerator – The Cyclotron – The Betatron.

## UNIT III:

**Radioactivity:** Natural Radioactivity – Properties of Alpha, Beta and Gamma rays – Determination of  $e/m$  of alpha particles - Experimental measurement of the range of Alpha particles - Theory of Alpha Decay – Neutrino theory of Beta Decay – Detection of Neutrino – K-electron capture – Determination of wavelength of Gamma rays (Du Mond curved crystal spectrometer) - Origin of Gamma Rays - Laws of Radioactivity.



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**UNIT IV:**

**Nuclear Fission and Fusion:** Nuclear Fission – Energy released in Fission – Bohr and Wheeler’s theory of Nuclear Fission – Chain Reaction – Critical Size – Natural Uranium and Chain Reaction – Atom Bomb - Nuclear Reactors – Nuclear Fusion – Source of Stellar Energy – Carbon-Nitrogen Cycle – Proton-Proton Cycle – Hydrogen Bomb - Controlled Thermonuclear Reactions.

**UNIT V:**

**Elementary Particles:** Introduction - Baryons – Hyperons – Leptons – Mesons – Particles and Anti-particles: Electron and Positron, Proton and Antiproton, Neutron and Antineutron, Neutrino and Antineutrino – Antimatter – The fundamental Interactions – Elementary Particle Quantum Numbers – Conservation laws and Symmetry – The Quark Model.

**Text Book:**

R. Murugesan & Er. Kiruthiga Sivaprasath – Modern Physics – Eighteenth Edition 2016 – S Chand Publications, New Delhi.

**Reference Books:**

1. Elements of Nuclear Physics – M. L. Pandya, RPS Yadav – 4<sup>th</sup> Edition 2011 - Kedar Nath Ram Nath Publications, New Delhi.
2. Nuclear Physics – D. C. Tayal – 2<sup>nd</sup> Edition 2011 - Himalaya Publishing House, New Delhi.
3. Nuclear Physics – Dr. S. N. Ghoshal – Revised Edition 2014 – S Chand & Co Ltd., New Delhi
4. Modern Physics – G. Aruldas and P. Rajagopal – Edition 2005 Reprint 2014 – PHI Learning Private Ltd.,

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	Fundamentals of Digital Electronics	Total Marks: 100		Hours Per Week	Credits
			CIA: 25	ESE: 75		
VI	20UAOCT603				4	3

### OBJECTIVES

- To introduce Number Systems and Codes
- To study the correlation between Boolean expressions

### COURSE OUTCOMES:

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

- CO1: Recollect number systems and binary codes
- CO2: Implement logic gates in arithmetic circuits
- CO3: Resolve the usage of flip-flops as counters and registers
- CO4: Investigate flip-flops in converters
- CO5: Explore semiconductor memories

### UNIT I:

**Number Systems:** Decimal system – Binary system – Octal system - Hexadecimal system - 1's and 2's Complements of Binary Numbers - Binary Coded Decimal (BCD) – Excess-3 Code - Gray Code.

**Logic Gates:** Inverter – OR Gate - AND Gate – NOR Gate - NAND Gate – De Morgan's Theorems - Exclusive OR and Exclusive NOR Gates

### UNIT II:

**Arithmetic Circuits:** Half Adder – Full Adder – Parallel Binary Adder - Half Subtractor – Full Subtractor – Parallel Binary Subtractor - Parallel Binary Adder and Subtractor (2's Complement)

**Flip-Flops:** R-S Flip-Flops – Clocked R-S Flip-Flop – D Flip-Flop – Edge-Triggered J-K Flip-Flop T Flip-Flop – Master-Slave J-K Flip-Flop.

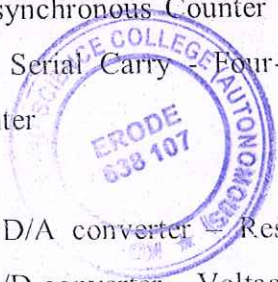
### UNIT III:

**Shift Registers:** Shift-Left Register - Shift-Right Register.

**Counters:** Asynchronous Counter – Mod-10 Counter – Mod-5 Counter – Four-bit Synchronous Counter with Serial Carry - Four-bit Synchronous Counter with Parallel Carry - Synchronous up/down counter

### UNIT IV:

**Converters:** D/A converter – Resistor Divider D/A converter – Binary Ladder Network D/A converter – A/D converter – Voltage to Time A/D converter – Dual slope integrator A/D converter



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– Counter type A/D converter - Voltage to Frequency A/D converter - Successive Approximation A/D converter.

#### UNIT V:

Semiconductor Memories: Memory unit – Concept of memory using registers – Read only memories: ROM, PROM, EPROM and EEPROM – RAM: Bipolar RAM, MOS RAM cells, Static MOS RAM cell and Dynamic MOS RAM


#### Text Books:

V. K. Puri – Digital Electronics – Tata Mc Graw-Hill Publishing Company Limited – 26<sup>th</sup> Reprint 2016.


#### Reference Books:

1. Digital Fundamentals – Thomas L. Floyd - Tenth Edition 2017 - Prentice Hall of India
2. Digital Principles and Applications - D. P. Leach and A. P. Malvino – Sixth Revised Edition 2006 - Tata McGraw - Hill, New Delhi
3. Digital Design – Morris Mano – Revised Edition 2002 - Prentice Hall of India

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

  
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Sem.	Course Code	CORE PRACTICAL – III	Total Marks: 100		Hours Per Week	Credits
VI	20UAOCP604	General Practical	CIA: 40	ESE: 60	3	4

### OBJECTIVES:

- To train the students on measurements and Instruments
- To strengthen the understanding of theoretical knowledge

### COURSE OUTCOMES:

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

- CO1: Recognize the principles of diffraction in experimental situations
- CO2: Explore the relation between theory and experiment
- CO3: Apply the knowledge of mechanics in real time applications
- CO4: Analyse the impact of Bandgap in conducting process
- CO5: Estimate the principle involved in determining the wavelength of laser source

(EXAMINATION AT THE END OF SIXTH SEMESTER)

### Any 12 Experiments Only

1. Spectrometer – Cauchy's Constant
2. Spectrometer –  $(i - i')$  Curve
3. Impedance and Power Factor of an Inductive Resistive Circuit
4. Study of Series Resonance Circuit
5. Study of Parallel Resonance Circuit
6. Potentiometer – Reduction Factor
7. Potentiometer – EMF of Thermocouple
8. Potentiometer – Comparison of EMF
9. Potentiometer – High Range Voltmeter
10. Field along the axis of a coil – Vibration Magnetometer
11. Ballistic Galvanometer – Comparison of Mutual Inductance
12. Ballistic Galvanometer – High Resistance by Charging
13. Young's Modulus – Koenig's Method - Uniform bending
14. Young's Modulus – Koenig's Method - Non-uniform bending



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15. Semiconductor Diode - Bandgap Determination

16. Study of Solar cell

**Demonstration**

1. He – Ne Laser – Wavelength of laser source
2. Nano particle preparation

Parameters	Maximum Marks
Record Note book	05
Formula Used and Circuit diagram (if applicable)	15
Tabulation	15
Observation	15
Calculation	05
Result	05
<b>Total</b>	<b>60</b>

  
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Sem.	Course Code	CORE PRACTICAL – IV Electronics Practical	Total Marks: 100		Hours Per Week	Credits
			CIA: 40	ESE: 60		
VI	20UAOCP605				2	3

### OBJECTIVES:

- To train the students on measurements and Instruments
- To strengthen the understanding of theoretical knowledge

### COURSE OUTCOMES:

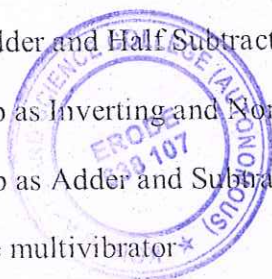
At the end of the course, Students will be able to

- CO1: Recollect the principles of semiconductors and evaluate its validation in practicals
- CO2: Understand the applications of logic gates in logic circuits
- CO3: Implicate the ideas of theory in constructing the circuits
- CO4: Investigate the basic programming of 8085 microprocessor
- CO5: Review the instruments in wide variety of applications

(EXAMINATION AT THE END OF SIXTH SEMESTER)

### Any 12 Experiments Only

1. Characteristics of Junction Diode
2. Characteristics of Zener Diode
3. Characteristics of a Transistor – CE configuration
4. Characteristics of UJT
5. Regulated Power Supply using IC
6. Single Stage RC coupled amplifier
7. Verification of Logic gates using IC
8. NAND gate as Universal building block
9. NOR gate as Universal building block
10. Verification of De Morgan's Theorem using IC
11. Half Adder and Half Subtractor using IC
12. Op-amp as Inverting and Non-inverting amplifier
13. Op-amp as Adder and Subtractor
14. Astable multivibrator\*



  
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15. Bistable multivibrator
16. Microprocessor – 8085 – Addition, Subtraction
17. Microprocessor – 8085 – 1's and 2's Complement Subtraction
18. Microprocessor – 8085 – Multiplication and Division

**Demonstration (any 2)**

1. CRO - Lissajous Pattern Formation
2. Hartley Oscillator
3. BCD to Seven segment display

Parameters	Maximum Marks
Record Note book	05
Formula Used and Circuit diagram (if applicable)	15
Tabulation	15
Observation	15
Calculation	05
Result	05
<b>Total</b>	<b>60</b>

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**ERODE – 638 107**

# **ACTIVITIES**



# KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

NANJANAPURAM, ERODE - 638 107

## DEPARTMENT OF PHYSICS

### One day National Seminar on “Emerging Technologies in Energy Devices and Functional Biomaterials” - 21.12.2020

**KONGU ARTS AND SCIENCE COLLEGE**  
(An Autonomous Institution Affiliated to Bharathiar University, Coimbatore)  
Erode, Tamilnadu

**DEPARTMENT OF PHYSICS**  
**DBT STAR COLLEGE SCHEME**

**One Day National Virtual Seminar**  
on  
**Emerging Technologies in Energy Devices and Functional Biomaterials**  
21.12.2020  
10.00 am

**Presidential Address**  
Thiru. K.Palanisamy  
Correspondent

**Felicitation**  
Dr. N.Raman  
Principal

**Resource Persons**



**Dr. P. Elumalai**  
Professor & Head  
Department of Green Energy Technology  
Madanjeet School of Green Energy Technologies  
Pondicherry University,  
Puducherry - 605014.



**Dr. Sarath Chandra Veerla**  
Associate Professor,  
Department of Humanities and Basic Sciences,  
Godavari Institute of Engineering and Technology (Autonomous),  
Rajahmundry - 533296  
Andhra Pradesh, India.

Registration Link : <https://forms.gle/BwpgFluU8Nemr1C8>

Join with us through Zoom  

One day National Seminar on “Emerging Technologies in Energy Devices and Functional Biomaterials” was organized under DBT Fund on 21.12.2020 with the Resource Persons Dr. P. Elumalai, Professor & Head, Department of Green Energy Technology, Madanjeet School of Green Energy Technologies, Pondicherry University, Puducherry and Dr. Sarath Chandra Veerla, Associate Professor, Godavari Institute of Engineering and Technology (Autonomous), Rajahmundry, Andhra Pradesh. Faculty Members, Research Scholars and PG students from various Institutes (290) acquired understanding of methodologies, tools and evaluation frameworks relevant to Energy Storage Devices. Also, participants were provided with sound knowledge on recent developments of Functional intelligent materials for Biological applications. Participants were further motivated to explore research in the current trending areas

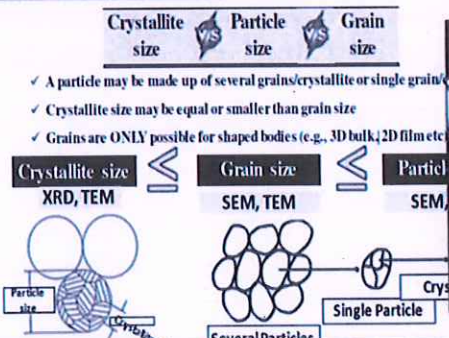
**Nanomaterials Characterization**

Crystallite size vs Particle size vs Grain size

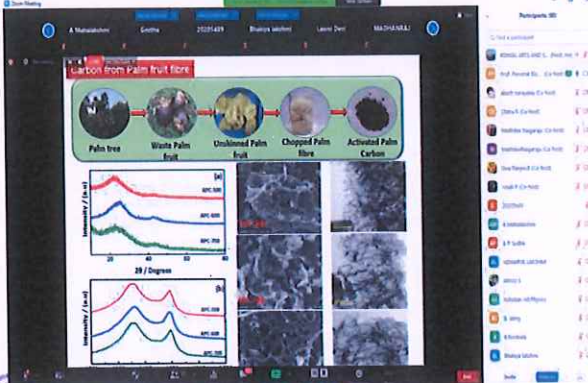
- ✓ A particle may be made up of several grains/crystallite or single grain
- ✓ Crystallite size may be equal or smaller than grain size
- ✓ Grains are ONLY possible for shaped bodies (e.g., 3D bulk, 2D film etc)

Crystallite size (XRD, TEM) vs Grain size (SEM, TEM) vs Particle size (SEM)

Particle size vs Crystallite size vs Grain size vs Single Particle vs Several Particles



**Carbon from Palm fruit fibre**



*R. Ch*  
**HEAD OF THE DEPARTMENT**  
**DEPARTMENT OF PHYSICS**  
**KONGU ARTS AND SCIENCE COLLEGE**  
**(AUTONOMOUS)**  
**ERODE - 638 107.**



*N. Raman*  
**Dr. N. RAMAN**  
**PRINCIPAL,**  
**KONGU ARTS AND SCIENCE COLLEGE**  
**(AUTONOMOUS)**  
**NANJANAPURAM, ERODE - 638 107.**



# KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

NANJANAPURAM, ERODE - 638 107

DEPARTMENT OF PHYSICS

A Two day Workshop on “Smart Phone Servicing” - 09.03.2021 & 10.03.2021

Kongu Arts and Science College  
 (An Autonomous Institution Affiliated to Bharathiar University, Coimbatore)  
 Erode - 638 107  
**Department of Physics**  
 Cordially invites you for the  
**-DBT Star College Scheme sponsored**  
**A Two Day Workshop**  
 on  
**Smart Phone Servicing**  
 (New Technology, Coimbatore)  
**Thiru. K. Palanisamy**  
 Correspondent  
 has graciously consented to preside over the function  
**Dr. N. Raman**  
 Principal  
 has graciously consented to felicitate the function  
 Participants  
 II B.Sc Physics  
 Date - 09.03.2021 & 10.03.2021

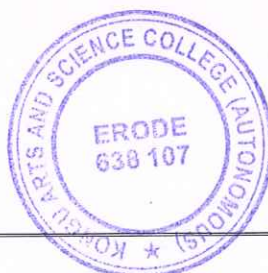




A Two Day Workshop on “Smartphone Servicing” was conducted in association with New Technology, Coimbatore under DBT Star College Scheme for the II B. Sc Physics Students (45), on 09.03.2021 & 10.03.2021. Students were exposed to the basic components in smart phones and also they gained knowledge on troubleshooting.



*[Signature]*  
**HEAD OF THE DEPARTMENT**  
**DEPARTMENT OF PHYSICS**  
**KONGU ARTS AND SCIENCE COLLEGE**  
**(AUTONOMOUS)**  
**ERODE - 638 107.**



*[Signature]*  
**Dr. N. RAMAN**  
**PRINCIPAL,**  
**KONGU ARTS AND SCIENCE COLLEGE**  
**(AUTONOMOUS)**  
**NANJANAPURAM, ERODE - 638 107.**



# KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

NANJANAPURAM, ERODE - 638 107

DEPARTMENT OF PHYSICS

One Day Workshop on "Electronic Components and Measurements" -19.03.2021

## Kongu Arts and Science College

(An Autonomous Institution Affiliated to Bharathiar University, Coimbatore)

Erode - 638 107



Department of Physics



Cordially invites you for the

**DBT Star College Scheme sponsored  
Workshop**

on

**Electronic Components & Measurements**

(For the First Year Students of Physics)

**Thiru. K. Palanisamy**

Correspondent

has graciously consented to preside over the function

**Dr. N. Raman**

Principal

has graciously consented to felicitate the function

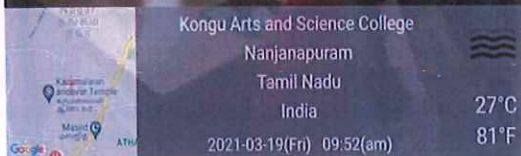
**Date : 19.03.2021**

**Time : 10 am**



**KONGU**  
Assuming the Best

One day Workshop on "Electronic Components and Measurements" was conducted on 19.03.2021 for the I B.Sc., Physics students (27) under DBT fund with Thilagavathi Electronics, Erode. Students were exposed to various basic electronic components like diode, resistors, capacitors, transistors, etc., Also, the usage of breadboard for electronic circuit construction was demonstrated in the workshop. Students were made to understand the classification of active and passive electronic components and their role in circuits. Students gained practical knowledge on PCB board soldering and learnt the construction of electronic circuits.



Kongu Arts and Science College

Nanjanapuram

Tamil Nadu

India

27°C

81°F

2021-03-19(Fri) 09:52(am)



Kongu Arts and Science College (Autonomous)

Nanjanapuram


Tamil Nadu

India


31°C

88°F

2021-03-19(Fri) 12:26(pm)

  
**HEAD OF THE DEPARTMENT  
DEPARTMENT OF PHYSICS  
KONGU ARTS AND SCIENCE COLLEGE  
(AUTONOMOUS)  
ERODE - 638 107.**



  
**Dr. N. RAMAN  
PRINCIPAL,  
KONGU ARTS AND SCIENCE COLLEGE  
(AUTONOMOUS)  
NANJANAPURAM, ERODE - 638 107.**



## KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

NANJANAPURAM, ERODE - 638 107

DEPARTMENT OF PHYSICS


Workshop on “Digital Storage Oscilloscope and Applications” - 20.03.2021




**Kongu Arts and Science College  
(Autonomous), Erode**  
DBT Star College Scheme **28**  
Department of Physics  
cordially invites you all for the  
**Workshop**  
on  
**Digital Storage Oscilloscope and  
Applications**  
Resource Person  
**S.P. Senthil Subramaniam**  
Mighty Electronics Equipments Corporation  
Coimbatore  
Date : 20.03.2021  
Time: 1.30 pm  
Venue : Physics Laboratory  
KONGU  
Assessing the Best

Workshop on “Digital Storage Oscilloscope and Applications” was organized by Service Engineer Mr.S.P. Senthil Subramaniam, Mighty Electronics Equipments Corporation, Coimbatore on 20.03.2021 to the I B.Sc., Physics students (27) under DBT star college scheme fund. Students gained the operating knowledge of Oscilloscope and its utility.



  
**HEAD OF THE DEPARTMENT  
DEPARTMENT OF PHYSICS  
KONGU ARTS AND SCIENCE COLLEGE  
(AUTONOMOUS)  
ERODE - 638 107.**



  
**Dr. N. RAMAN  
PRINCIPAL,  
KONGU ARTS AND SCIENCE COLLEGE  
(AUTONOMOUS)  
NANJANAPURAM, ERODE - 638 107.**



**KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)**

**NANJANAPURAM, ERODE - 638 107**

**DEPARTMENT OF PHYSICS**

Virtual Guest lecture on “Fundamentals of Electricity for Physicists” -  
22.03.2021

**KONGU ARTS AND SCIENCE COLLEGE**  
(AN AUTONOMOUS INSTITUTION AFFILIATED TO BHARATHIAR UNIVERSITY, COIMBATORE)  
**NANJANAPURAM, ERODE - 638107,**  
**TAMILNADU**

**DBT STAR COLLEGE SCHEME**

**Department of Physics**

cordially invite you for the online  
Guest Lecture on  
*Fundamentals of Electricity for Physicists*

**Presidential Address**  
**Thiru. K. Palanisamy**  
Correspondent

**Felicitation**  
**Dr.N.Raman**  
Principal

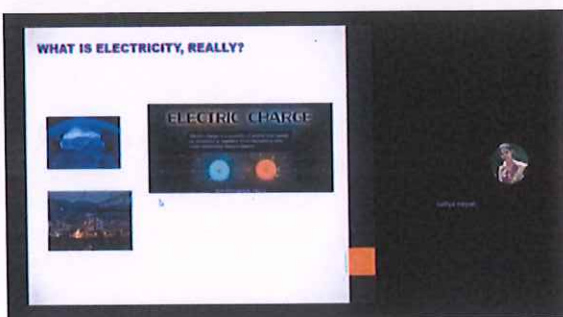
*Resource Person*  
**Dr. P. Sathya**  
Assistant Professor  
Department of Physics  
Salem Sowdeswari College  
Salem

Date: 22.03.2021  
Time: 02.00 pm

*Join us through...*

**KONGU**  
Assessing the Best

Virtual Guest lecture was organized on “Fundamentals of Electricity for Physicists” on 22.03.2021 to the II & III B.Sc., Physics students (100) under DBT star college scheme and Dr.P.Sathya, Assistant Professor, Salem Sowdeswari College, Salem acted as a Resource person. Students understood the fundamental concept of electricity for practical applications. Students gained the analyzing and working knowledge over the field of current electricity and construct new circuits.



*Dr. N. Raman*  
**HEAD OF THE DEPARTMENT**  
**DEPARTMENT OF PHYSICS**  
**KONGU ARTS AND SCIENCE COLLEGE**  
**(AUTONOMOUS)**  
**ERODE - 638 107.**



*Dr. N. Raman*  
**Dr. N. RAMAN**  
**PRINCIPAL,**  
**KONGU ARTS AND SCIENCE COLLEGE**  
**(AUTONOMOUS)**  
**NANJANAPURAM, ERODE - 638 107.**



# KONGU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

NANJANAPURAM, ERODE - 638 107

## DEPARTMENT OF PHYSICS

National Virtual Seminar on “Nanotechnology and its Applications” - 29.03.2021

**KONGU ARTS AND SCIENCE COLLEGE**  
An Autonomous Institution Affiliated to Bharathiar University, Coimbatore  
Approved by UGC, AICTE, New Delhi & Accredited by NAAC  
An ISO 9001:2015 certified institution  
E-rode - 638 107, Tamil Nadu  
Website: www.kasc.ac.in

**DBT Star Departments**  
(Biochemistry, Biotechnology & Physics)  
cordially invite you for the DBT sponsored  
One Day Virtual National Seminar on

**Nanotechnology and its Applications**

29 March 2021  
Monday

**President**  
Thiru. K. Palanisamy  
Coimbatore

**Vice-Chairman**  
Dr. N. Ramani  
Dindur


**Topic: "Nanoscience & Nanotechnology: Application to Chemical Biology"**  
Prof. R. Ramaraj, FNA, FAcS, FNASc.,  
Professor of Eminence & DAE Raja Ramanna Fellow  
(Professor & Head (Retd.), Dept. of Physical Chemistry)  
School of Chemistry, Madurai Kamaraj University  
Madurai

**Topic: "Computational Studies on Interaction of Biomolecules with Nanomaterials"**  
Dr. V. Veena,  
Chief Scientist & Head  
Centre for High Computing  
CSIR - Central Leather Research Institute  
Adyar, Chennai


**Topic: "Research Trends in Nanobiotechnology"**  
Dr. V. Veena  
Assistant Professor  
Department of Biotechnology  
Rava University  
Bangalore

Registration Link: <https://forms.godAjU-Dex4y2W11C>

National Virtual Seminar on “Nanotechnology and its Applications” was jointly organized by Physics, Biochemistry and Biotechnology departments on 29.03.2021. Resource persons were Prof.R.Ramaraj, Professor of Eminence & DAE Raja Ramanna Fellow (Prof. & Head (Retd.), Madurai Kamaraj University, Madurai, Dr.V.Subramanian, Chief Scientist & Head, CSIR – Central Leather Research Institute, Chennai and Dr.V.Veena, Assistant Professor, Department of Biotechnology, Rava University, Bangalore. Participants from various Institutions Researchers were motivated to explore further in the current trending research areas.

  
**HEAD OF THE DEPARTMENT  
DEPARTMENT OF PHYSICS  
KONGU ARTS AND SCIENCE COLLEGE  
(AUTONOMOUS)  
ERODE - 638 107.**



  
**Dr. N. RAMAN  
PRINCIPAL,  
KONGU ARTS AND SCIENCE COLLEGE  
(AUTONOMOUS)  
NANJANAPURAM, ERODE - 638 107.**