



# **KONGU ARTS AND SCIENCE COLLEGE**

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

**ERODE – 638 107**

**B.Sc (Physics)**



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**2018-2019**


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

ERODE – 638 107

DEPARTMENT OF PHYSICS

B. Sc PHYSICS


SCHEME OF EXAMINATION – CBCS PATTERN

(For the candidates admitted during the Academic Year 2017 – 2018 and onwards)



Part	Course Code	Course Title	Inst. Hrs /Week	T/P	Examination Details				Credits
					Duration in Hours	CIA	ESE	Total Marks	
<b>SEMESTER I</b>									
I	17T01	Language - I	6	T	3	25	75	100	4
II	17E01	English - I	6	T	3	25	75	100	4
III	17UAOCT101	Core – I Mechanics, Properties of Matter and Sound	6	T	3	25	75	100	5
	-	Core Practical - I	3	P	-	-	-	-	-
	17UAOAT102	Allied A – Chemistry Theory I	4	T	3	20	55	75	3
	-	Allied Chemistry Practical	3	P	-	-	-	-	-
IV	17ES01	Foundation Course I: Environmental Studies #	2	T	3	-	50	50	2
<b>Total</b>			<b>30</b>					<b>425</b>	<b>18</b>
<b>SEMESTER II</b>									
I	17T02	Language - II	6	T	3	25	75	100	4
II	17E02	English - II	6	T	3	25	75	100	4
III	17UAOCT201	Core – II Heat and Thermodynamics	6	T	3	25	75	100	5
	17UAOCP202	Core Practical - I	3	P	3	40	60	100	4
	17UAOAT203	Allied A – Chemistry Theory - II	4	T	3	20	55	75	3
	17UAOAP204	Allied Chemistry Practical	3	P	3	20	30	50	2
IV	17VE01	Foundation Course II: Value Education #	2	T	3	-	50	50	2
<b>Total</b>			<b>30</b>					<b>575</b>	<b>24</b>
<b>SEMESTER III</b>									
I	17T03	Language – III	6	T	3	25	75	100	4
II	17E03	English – III	6	T	3	25	75	100	4
III	17UAOCT301	Core – III Electricity and Magnetism	4	T	3	25	75	100	4
	-	Core Practical - II	2	P	-	-	-	-	-
	17UAOAT302	Allied B – Allied Mathematics I	7	T	3	25	75	100	4
	17UAOST303	Skill Based Course – Scientific Facts I	3	T	3	20	55	75	3
IV	17AT01 / 17BT01 / 17UAONT304	Advanced Tamil/Basic Tamil @ OR Non-Major Elective I *	2	T	3	-	75	75	2
<b>Total</b>			<b>30</b>					<b>550</b>	<b>21</b>



  
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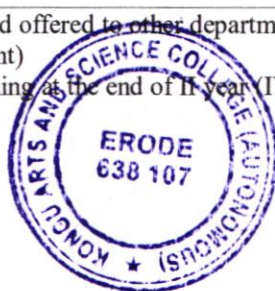


Part	Course Code	Course Title	Inst. Hrs /Week	T/P	Examination Details				Credits
					Duration in Hours	CIA	ESE	Total Marks	
<b>SEMESTER IV</b>									
I	17T04	Language – IV	6	T	3	25	75	100	4
II	17E04	English – IV	6	T	3	25	75	100	4
III	17UAOCT401	Core – IV Optics	4	T	3	25	75	100	4
	17UAOCP402	Core Practical - II	2	P	3	40	60	100	4
	17UAOAT403	Allied B – Allied Mathematics II	7	T	3	25	75	100	4
IV	17UAOST404	Skill Based Course – Scientific Facts II	3	T	3	20	55	75	3
	17AT02 / 17BT02 / 17UAONT405	Advanced Tamil/Basic Tamil @ OR Non-Major Elective II*	2	T	3	-	75	75	2
	<b>Total</b>		<b>30</b>					<b>650</b>	<b>25</b>
<b>SEMESTER V</b>									
III	17UAOCT501	Core – V Mathematical Physics	5	T	3	25	75	100	4
	17UAOCT502	Core – VI Quantum Mechanics and Relativity	5	T	3	25	75	100	4
	17UAOCT503	Core – VII Atomic Physics and Spectroscopy	4	T	3	25	75	100	4
	17UAOCT504	Core – VIII Basic Electronics	4	T	3	25	75	100	3
	-	Core Practical – III General Practical	3	P	-	-	-	-	-
	-	Core Practical – IV Electronics Practical	2	P	-	-	-	-	-
IV	17UAOET505/ 17UAOET506/ 17UAOET507	Elective – I	4	T	3	25	75	100	4
	17UAOST508	Skill Based Course – Office Automation	3	T	3	20	55	75	3
	17UAOIT01	Institutional Training #	-	-	Completed/ Not Completed	-			
<b>Total</b>			<b>30</b>					<b>575</b>	<b>22</b>
<b>SEMESTER VI</b>									
III	17UAOCT601	Core – IX Solid State Physics	5	T	3	25	75	100	4
	17UAOCT602	Core – X Nuclear Physics	5	T	3	25	75	100	4
	17UAOCT603	Core – XI Fundamentals of Digital Electronics	4	T	3	25	75	100	3
	17UAOCP604	Core Practical – III General Practical	3	P	3	40	60	100	4
	17UAOCP605	Core Practical – IV Electronics Practical	2	P	3	40	60	100	3
	17UAOET606/ 17UAOET607/ 17UAOET608	Elective – II	4	T	3	25	75	100	4
	17UAOET609/ 17UAOET610/ 17UAOET611	Elective – III	4	T	3	25	75	100	4
IV	17UAOSP612	Skill Based Course – Practical Office Automation & Python Programming for Physics	3	P	3	30	45	75	3
	17NS01/ 17NC01/ 17YR01/ 17PE01	Extension Activities @	-	-	-	-	-	50	1
<b>Total</b>			<b>30</b>					<b>825</b>	<b>30</b>
<b>TOTAL</b>								<b>3600</b>	<b>140</b>

\* Only ESE (End Semester Examination) and offered to other department students

@ Only CIA (Continuous Internal Assessment)

# Students should undergo Institutional Training at the end of II year (IV semester) for the period of 15 days and have to submit a report in III year (V semester)



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**List of Elective Papers**  
(Students can choose any one of the papers as electives)

Sem.	Course Code	Part - III	Course
V	17UAOET505	Elective - I	A Laser, Fiber Optics and Non-Linear Optics
	17UAOET506		B Renewable Energy Sources
	17UAOET507		C Material Science
VI	17UAOET606	Elective - II	A Microprocessor
	17UAOET607		B Biomedical Instrumentation
	17UAOET608		C Numerical Methods
VI	17UAOET609	Elective - III	A Python for Physics
	17UAOET610		B Introduction to Nanoscience
	17UAOET611		C Communication System

**List of Allied Papers**

Sem.	Course Code	Course
I	17UAOAT102	Allied A – Chemistry Theory I
II	17UAOAT203	Allied A – Chemistry Theory II
	17UAOAP204	Allied Chemistry Practical
III	17UAOAT302	Allied B – Mathematics – I
IV	17UAOAT403	Allied B – Mathematics - II


**List of Skill Based Courses**

Sem.	Course Code	Course
III	17UAOST303	Scientific Facts I
IV	17UAOST404	Scientific Facts II
V	17UAOST508	Office Automation
VI	17UAOSP612	Practical – Office Automation & Python Programming for Physics

**List of Advanced Learner Courses**

Sem.	Course Code	Course	Credits
IV	17UAOAL406	Bio-Physics	2
	17UAOAL407	Energy Physics	2
V	17UAOAL509	Applied Physics	2
	17UAOAL510	Astrophysics	2



  
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**Non - Major Elective Courses  
(Offered to other department students)**

Sem.	Course Code	Course
III	17UAONT304	Introduction to Electricity and Electronics
IV	17UAONT405	Electrical and Electronic Appliances



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Chairman  
Board of Studies – Physics  
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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**

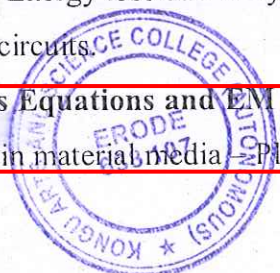
**Electrostatics:** Coulomb's law – Electric field – Electric field due to a point charge – Electric potential – Electric potential due to a point charge – Relation between them – Potential at a point due to a uniformly charged conducting sphere - Gauss's law and its application (Electric field due to 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 ( $\chi$ ) and magnetic permeability ( $\mu$ ) – 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
III	17UAONT304	Introduction to Electricity and Electronics	CIA: -	ESE: 75	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**

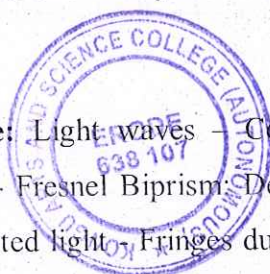
**Lens :** Properties of light: Laws of Reflection and Laws of Refraction – Fermat's Principle of least time - Lens Equation (Thin Lens) – Deviation by a thin lens - Equivalent focal length of two thin lenses – Cardinal Points – Principal points and Principal planes – Focal points and Focal planes –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

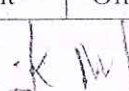
**Text Book:**

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
<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	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

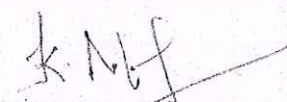
### Text Books:

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 , 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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