D.K.M. COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1

DEPARTMENT OF PHYSICS

SYLLABUS FOR BACHELOR DEGREE COURSE IN PHYSICS

WITH EFFECT FROM 2019-2020

PROGRAMME OUTCOMES (PO):

PO 1: Students attain proficiency in Critical thinking, analytical thinking and Problem solving and perform Computations and logical reasoning.

PO 2: Students will be able to enhance to solve problems.

PO 3: To understand the role of chemistry and mathematics in daily life and in the society.

PO 4: To create thirst in critical thinking, analyzing and problem solving skills.

PO 5: To develop the activity in understanding and applying the principles in science.

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Allied Physics I

Semester	Subject Code	Category	Lecture	Theory		Practical	Credit
				Hr/week	Hr/Semester		
I		Allied	60 Hrs	4	60	NIL	4

COURSE OBJECTIVES:

- Apply Physics principles and mathematical methods of various fields of Physics.

- To explain various Physical, Electrical and Optical properties of materials.

- To obtain the intellectual ability to translate, interpret and extrapolate the most important scientific models and laws governing the motion of objects.

COURSE OUTCOMES:

On the successful completion of this course students will be able

CO Number	CO Statement	Knowledge Level(K1-K4)
CO1	To get the basic knowledge about materials which they use their day today life and its practical applications.	K2
CO2	To analysis basics of optics and apply them to intuitive capability to research on things involved in light and	K4
CO3	To design and trouble shoot basic electrical circuits and to classify the magnetic materials	K3
CO4	To extend the application oriented knowledge of Ultrasonic waves and its role in building construction.	K2
CO5	To construct, simple electronic components and to apply them in their day-today life.	K3

Knowledge level: K1-Remember, K2-Understanding Level, K3-Apply, K4 –Analysis.

MAPPING WITH PROGRAMME OUTCOMES

Cos	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	S	S
CO2	S	S	S	M	M
CO3	S	M	S	S	M
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S- Strong   M – Medium   L – Low

ALLIED PHYSICS I

UNIT-I: PROPERTIES OF MATTER (12 Hrs)

Elasticity: Hooke's Law-Elastic Constants- Relation between three moduli of elasticity- Stress and strain diagram- Poisson's ratio- Bending of Beam-Bending Moment-Cantilever-Depression at the Loaded End of the Cantilever- Determination of Young's Modulus by Non-Uniform Bending- I shape Girder-Principle and Working of Atomic force microscopy.

Torsion: Torsion couple- Potential Energy in a Twisted Wire- Torsional Pendulum -Rigidity Modulus-Determination of Rigidity Modulus by Torsional Oscillation (Without Masses)- Applications of Torsion Springs- in Clocks-Cloths Pin- automotive-Medical Equipments & Door Hinges.

Viscosity: Viscosity of Liquids-Viscous Force-Stokes' law-Co-Efficient Of Viscosity of a Liquid- Poiseuille's formula (No Derivation)-Determination of Co-Efficient of Viscosity (Graduated Burette method) -Comparison of Viscosities of Two Liquids by Graduated Burette Method- Applications of Viscosity in day today life (any five).

UNIT- II: OPTICS (12 Hrs)

Defects of Images (Lens): Spherical aberration- Methods to minimize spherical aberration-minimizing spherical aberration with two lenses out of contact- Rainbow- Primary Rainbow.

Physical Optics: Coherent sources -Interference- Determination of diameter of a thin wire by air wedge- Test for optical flatness- Interference in Mechanical & Radio waves –Holograms-applications of holography.

Polarisation: Optical activity- specific rotatory power of an optically active substance-Determination of specific rotatory power of a solution using Laurent half-shade polarimeter-uses of polarized light. Applications of Polarized Light: LCD.

UNIT-III: ELECTRICITY AND MAGNETISM (12 Hrs)

Electricity-Transient current-Growth and decay of charge containing Resistance and Capacitor in a circuit (RC-Series Circuit) -Growth and decay of current in a circuit containing Inductance and resistance (LR series circuit) - smart screen-touch screen -voltage type-current type.

Introduction to magnetism- magnetic Induction (B)-magnetisation (M)-magnetic intensity (H)-relation between B & M- Different types of magnetic materials (dia- , para- , ferro – and antiferro)- hysteresis loop.

UNIT-IV: SOUND AND ACCOUSTICS OF BUILDING (12Hrs)

Sound: Transverse vibration of strings- Velocity and frequency of vibrations of a stretched string- laws of vibrations along a stretched string- Sonometer-A.C.Frequency- Steel wire-Brass wire.

Ultrasonic's: Introduction to Ultrasonics -Production of Sound waves by Piezo-electric method-Properties and uses-applications of ultrasonics: SONAR and NDT.

Acoustics of buildings: Reverberation- Reverberation time- conditions for the perfect acoustics.

UNIT-V: DIGITAL ELECTRONICS   (12 Hrs)

Junction diode-Construction and working of AND, OR, NOT, NAND and NOR gates using diodes-Demorgan's theorem-Zener diode characteristics-Zener diode as voltage regulator-Rectifier-full wave bridge rectifier.

Integrated Circuits- SSI- MSI- LSI- VLSI- Advantages of IC's- Limitations of IC's-Fabrication of diode and transistor by monolithic technology.

TEACHING METHODOLOGY:

- Class Room Teaching
- Assignments
- Discussions
- Home Test
- PPT Presentations
- Mini Projects
- Demo using Models

TEXT BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	R. Murugesan	Allied Physics	Chand & Co. First Edition	2005
2.	Prof. Dr.G.Ravichandran,	Allied Physics Part-I	Ppadmapriya Publications, Puducherry First Edition	2007
3.	D.S.Mathur	Element of Properties of matter	S.Chand & Co.	1999
4.	Prof. Subramaniam	Optics	S.Chand & Co.	2007
5.	R. Murugesan,	Modern physics	S.Chand & Co.	2004

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
6.	Hugh D. Young and Roger A. Freedman,	Sears & Zemansky's University Physics with Modern Physics	Pearson publications, 14th Edition	2015

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Venugopal	Digital Circuits and systems	Tata McGraw Hill	2011
2.	S. Salivahanan & N. S.Kumar,	Electronic Devices and circuits	Tata McGraw Hill	2012
3.	U.Tietze,	Handbook of design and applications	Ch. Schenk,	2008
4.	Integrated Electronics: Analog and Digital circuits and Systems	Jacob Millmann and Christos C Halkias	McGraw Hill,	2013

WEB SOURCE:

1. http://www.scienceclarified.com/everyday/Real-Life-Chemistry-Vol-3-Physics-Vol-1/Fluid-Mechanics-Real-life-applications.html

2. http://www.circuitstoday.com/monolithic-ic

3. https://www.elprocus.com/ever-wondered-lcd-works/

SYLLABUS DESIGNER

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   Vellore.
2. **Dr. N. Jabena Begum,**
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Allied Physics II

Semester	Subject Code	Category	Lecture	Theory		Practical	Credit
				Hr/week	Hr/Semester		
II		Allied	60 Hrs	4	60	2	6

COURSE OBJECTIVES:

- To understandard the basic knowledge with the contents of, Fundamentals of Materials Science
- To know about the basis of nanomaterials and its characterization and applications, and also to know about the principles used in the characterization techniques used to study the nanomaterials.
- To understand and describe the principles behind various superconducting applications

COURSE OUTCOMES:

On the successful completion of this course students will be able

CO Number	CO Statement	Knowledge Level(K1-K4)
CO1	To develop critical thinking on the nature of materials like conductors, semiconductors and dielectrics	K3
CO2	To analyze different types of crystal structures and its behaviour	K4
CO3	To understand the principle behind nanomaterial and its applications in various fields.	K2
CO4	To extend the application oriented knowledge on communication technology.	K3
CO5	To understand the basis of superconductivity and to apply them in our day today life	K2

Knowledge level: K1-Remember, K2-Understanding Level, K3-Apply, K4 –Analysis.

MAPPING WITH PROGRAMME OUTCOMES

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	S	S	S	S	M
CO3	M	M	S	M	S

CO4	M	S	S	M	M
CO5	S	S	S	S	S

ALLIED PHYSICS II

UNIT I: CONDUCTOR, SEMICONDUCTOR AND DIELECTRIC MATERIALS
(12hrs)

Solids-Classification of solids - Energy band theory - Electrical and thermal properties: Conductors-semiconductors and dielectrics - Intrinsic & extrinsic semiconductors - n-type and p-type semiconductor-reason for using copper instead of aluminium conductors in electrical installation work- Hall Effect- Sensors.

UNIT-II: CRYSTALLOGRAPHY (12hrs)

Crystalline and amorphous solids-lattice-Unit cell - Primitive cell – lattice parameters- Lattice planes-classification of crystal system - Bravias lattice - Miller indices –Bragg's law–structure determination-XRD technique- reciprocal lattice (concepts only)-crystal imperfections: point, line, surface and volume defects

UNIT -III: NANOMATERIALS AND ITS APPLICATIONS (12hrs)

Nanomaterials-Classification of nanomaterials (0D,1D and 2D)-surface to volume ratio-Properties of materials Vs nanomaterials- preparation methods: bottom up and top down method.
Quantum dot-Carbon nanotube (CNT):types and applications-graphene-thin film-thin film in PV technology for energy conversion – as photocatalyst-as anti microbial agents.

UNIT IV: LASERS AND FIBER OPTICS (12hrs)

Lasers: Principle- Spontaneous and Stimulated Emission - types: CO_2 and dye lasers-applications.
Fiber Optics: Principle: Total internal reflection – Acceptance angle -Numerical aperture-Classification of fibres based on refractive index and modes:Step index & Graded index, Single & Multi mode - Fiber optic communication system- block diagram- merits and demerits of fiber optic communication system.

UNIT V: SUPER CONDUCTIVITY (12hrs)

Superconductivity and its occurrence- Type I and II super conductors –properties- Meissner effect- isotope effect- postulates of BCS theory- Low temperature and high temperature conductivity -applications of superconductors: SQUIDS-magnetic levitation.
TEACHING METHODOLOGY:

- Class Room Teaching
- Assignments
- Discussions

- Home Test
- PPT Presentations
- Demo using Models

TEXT BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Arumugam M	Materials Science.	Anuradha publishers	2010
2.	Pillai S.O.	Solid State Physics.	New Age International (P) Ltd., publishers,	2009
3.	K. Ravichandran, K. Swaminathan, B. Sakthivel,	Introduction to Thin Films,	Research India Publications,	2013
5.	K. Ravichandran, K. Swaminathan, B. Sakthivel, C. Ravidhas,	Introduction to Characterization of Nanomaterials and Thin Films	Jazym Publications,	2015
6.	Er. Rakesh Rathi	Nanotechnology	S.chand Publication	2009
7.	Prof.Dr.G. Ravichandran	Allied Physics Part-II	padmapriya Publications, Puducherry, First Edition	2007
8.	B.B. Laud	Lasers and Non-Linear optics,	New Age International, New Delhi	2011
9.	Dr.A.Chandrasekaran	Engineering Physics	Scitech publishers	2019

REFERENCE BOOKS:

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Palanisamy P.K.	Materials Science.	SCITECH Publishers,	2011
2.	Senthilkumar G.	Engineering Physics II.	VRB Publishers,	2011
3.	Mani P.	Engineering Physics II.	Dhanam Publications	2011
4.	Marikani A.	Engineering Physics	PHI Learning Pvt., India,	2009
5.	S. Shanmugam,.	Nanotechnology	TBH Edition	2010

6.	K.Thyagarajan and Ajay Ghtak	Introduction to Fiber optics	Cambridge, University Press	1999
7.	John M. Senior,	Optical fiber communications: Principles and practice	PHI, 2nd edition.	2014

WEB SOURCES:

1. https://www.electrochem.org/semiconductors-shaping-society
2. https://www.scribd.com/doc/26247685/Practical-Applications-of-Electrical-Conductors
3. http://hyperphysics.phy-astr.gsu.edu/hbase/Solids/Squid.html

SYLLABUS DESIGNER

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ALLIED PHYSICS PRACTICAL

1. Young's Modulus- Non-uniform bending method using Pin and Microscope.

2. Determination of rigidity modulus by static torsion method.

3. Torsion Pendulum - determination of rigidity modulus – without mass.

4. Determination of Co-efficient of viscosity- Graduated Burette.

5. Determination of surface tension by drop weight method.

6. Specific heat capacity of a liquid- by Newton's law of cooling.

7. Sonometer- Determining A.C Frequency (Screw gauge is given)

8. Potentiometer – calibration of low range voltmeter.

9. Potentiometer – calibration of ammeter

10. Figure of merit and voltage sensitiveness of a galvanometer.

11. Air wedge – diameter of thin wire

12. Spectrometer – determination of angle of prism and refractive index

13. Spectrometer – Grating – minimum deviation –Wavelength of mercury lines.

14. Construction of AND, OR gates using diodes and NOT by using transistor

15. Reverse characteristics of Zener diode-Zener diode as voltage regulator.

SCHEME OF EVALUATION:

S.No	Theory	Theory	Practical's
1	External marks	75	60
2	Internal marks	25	40

S.No	UNITS	2Marks	5Marks	10Marks
1	I	1,2	1	1 unit (or) 2 unit
2	II	3.4	2	
3	III	5.6	3	3 unit (or) 4unit

4	IV	7,8	4	
5	V	9,10	5	5 unit (or) Either or pattern 1 from any unit
			6,7,8 from any three units	