



SRM
UNIVERSITY
(Under section 3 of UGC Act 1956)

DEPARTMENT OF PHYSICS AND NANOTECHNOLOGY

LESSON PLAN

Course Code: UPY15361

Course Title: ALLIED PHYSICS – I

**B.Sc. CHEMISTRY- SECOND YEAR
(2016-2017 REGULATION)**

THIRD SEMESTER

SRM UNIVERSITY

SRM NAGAR, KATTANKULATHUR – 603 203

SRM UNIVERSITY
DEPARTMENT OF PHYSICS AND NANOTECHNOLOGY
Second Year B.Sc. Chemistry (2016-2017 Regulation)

Course Code: UPY15361

Course Title: ALLIED PHYSICS - I

Semester: III

Course Time: JULY – NOVEMBER-2017

Location: S.R.M.UNIVERSITY

OBJECTIVES

1. To understand the fundamentals of physics.
2. To give the basic understanding of material properties.
3. To educate and motivate the students in the field of science.
4. To acquire knowledge on magnetism and dielectrics

Assessment Details:

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| Cycle Test – I | : | 10 Marks |
| Cycle Test – II | : | 10 Marks |
| Model Exam | : | 20 Marks |
| Assignment | : | 5 Marks |
| Attendance | : | 5 Marks |

SRM UNIVERSITY

DEPARTMENT OF PHYSICS AND NANOTECHNOLOGY Second Year B.Sc Chemistry (2016-2017 Regulation)

| Semester | Course Code | Course Title | L | T | P | Total of LTP | C |
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| I | UPY15361 | ALLIED PHYSICS - I | 4 | 0 | 0 | 4 | 4 |

UNIT I – SIMPLE HARMONIC MOTION AND CIRCULAR MOTION 12 Hours

Time period, Amplitude – Phase – Spring mass system – Simple pendulum, Composition of two simple harmonic motions of equal periods in a straight line and at right angles – Lissajous figures – Damping force – Damped harmonic oscillator – Uniform circular motion – Acceleration of a particle in a circle – centripetal and centrifugal forces - Banking on curved roads – motion of a car around a circle.

UNIT II – PROPERTIES OF MATTER 12 Hours

Elasticity and plasticity - Elastic constants. Bending of beams – Young's modulus by non - uniform bending, Torsion in a wire – determination of rigidity modulus of by torsion pendulum – Viscosity –Coefficient of viscosity – Poissuelle's formula - Stoke's law – terminal velocity. Surface tension: Molecular theory of surface tension – Excess pressure inside a drop and bubble.

UNIT III – HEAT AND THERMODYNAMICS 12 Hours

Kinetic theory of gases – basic postulates, ideal gas laws –Van Der Waal's equation of states, pressure of an ideal gas, RMS speed. Laws of thermodynamics – entropy – change of entropy in reversible and irreversible processes. Low temperature: Joule – Kelvin effect, theory and applications – Liquefaction of gases – Linde's process – adiabatic demagnetization.

UNIT IV – ELECTRICITY AND MAGNETISM 12 Hours

Electric charge, conservation of charge – permittivity – Coulomb's law –Electric field – electric potential –Gauss's law and its applications –conductors – dielectrics –electric current – Ohm's law - Magnetic induction – permeability - susceptibility - Magnetic field due to a current carrying conductor – Biot – Savart's law – field along the axis of a coil – force on a conductor carrying current in a magnetic field. Ampere's circuital law - Faraday's law – Gradient, Curl and Divergence. E - M waves - Maxwell's equations in free space.

UNIT V – OPTICS – I 12 Hours

Light and Optics - Fermat's principle, laws of reflection and refraction - total internal reflection and its illustrations. Mirrors and lenses – lens formula – combinations of thin lenses - Refraction through a prism - combination of two prisms to produce dispersion without deviation and deviation without dispersion - Defects of images–Coma distortion – spherical and chromatic aberration in lenses.

TEXT BOOKS

1. Resnick and D. Halliday, *Fundamentals of physics* by R, Wiley publication, 8th edition, 2011.
2. Dr. R. K. Agarwal, Rekha Jain, Dr. Garima Jain, *Optics* by Krishna prakashan media Ltd., 2006.

REFERENCES

1. P.V. Naik *Principles of physics* PHI Learning Pvt. Ltd, 2006.
2. Dr. D. John Thiruvadigal, Dr. S. Ponnusamy, Dr. L. Sudha and M. Krishnamohan, *Physics for Technologists*, Vibrant Publication, 2013.
3. J. B. Rajam, S. Chand, *Physics for Technologists*, 1981.
4. Brijilal and Subramanian, *Elements of properties of matter*, S. Chand Limited, 1974
5. M. W. Zemansky and R.H. Dittman, *Heat and Thermodynamics* by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011

LESSON PLAN

Subject Name: ALLIED PHYSICS - I
Subject Code: UPY15361

| Unit I | | |
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| Lecture Hour | Description | Reference with chapter |
| 1 | Time period, Amplitude – Phase | P.V. Naik <i>Principles of physics</i> PHI Learning Pvt. Ltd, 2006. |
| 2 | Spring mass system | P.V. Naik <i>Principles of physics</i> PHI Learning Pvt. Ltd, 2006. |
| 3 | Simple pendulum | P.V. Naik <i>Principles of physics</i> PHI Learning Pvt. Ltd, 2006. |
| 4 | Lissajous figures introduction | P.V. Naik <i>Principles of physics</i> PHI Learning Pvt. Ltd, 2006. |
| 5 | Composition of two simple harmonic motions of equal periods in a straight line | P.V. Naik <i>Principles of physics</i> PHI Learning Pvt. Ltd, 2006. |
| 6 | Composition of two simple harmonic motions of equal periods at right angles | P.V. Naik <i>Principles of physics</i> PHI Learning Pvt. Ltd, 2006. |
| 7 | Lissajous figures geometries | P.V. Naik <i>Principles of physics</i> PHI Learning Pvt. Ltd, 2006. |
| 8 | Damping force – Damped harmonic oscillator | P.V. Naik <i>Principles of physics</i> PHI Learning Pvt. Ltd, 2006. |
| 9 | Damping force – Damped harmonic oscillator | P.V. Naik <i>Principles of physics</i> PHI Learning Pvt. Ltd, 2006. |
| 10 | Uniform circular motion – Acceleration of a particle in a circle | Resnick and D. Halliday, <i>Fundamentals of physics</i> by R, Wiley publication, 8 th edition, 2011 |
| 11 | Centripetal and centrifugal forces | Resnick and D. Halliday, <i>Fundamentals of physics</i> by R, Wiley publication, 8 th edition, 2011 |

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| 12 | Banking on curved roads – motion of a car around a circle | Resnick and D. Halliday, <i>Fundamentals of physics</i> by R, Wiley publication, 8 th edition, 2011 |
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| | CYCLE TEST - I | Unit I |
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| Unit II | | |
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| Lecture Hour | Description | Reference with chapter |
| 13 | Elasticity and plasticity - Elastic constants | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 14 | Bending of beams | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 15 | Bending of beams | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 16 | Young's modulus by non - uniform bending | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 17 | Torsion in a wire | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 18 | Determination of rigidity modulus of by torsion pendulum | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 19 | Determination of rigidity modulus of by torsion pendulum | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 20 | Viscosity –Coefficient of viscosity | Brijilal and Subramanian, <i>Elements of properties of matter</i> , S. Chand Limited, 1974 |
| 21 | Poissuelle's formula | Brijilal and Subramanian, <i>Elements</i> |

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| | | <i>of properties of matter</i> , S. Chand Limited, 1974 |
| 22 | Stoke's law – terminal velocity | Brijilal and Subramanian, <i>Elements of properties of matter</i> , S. Chand Limited, 1974 |
| 23 | Surface tension: Molecular theory of surface tension | Brijilal and Subramanian, <i>Elements of properties of matter</i> , S. Chand Limited, 1974 |
| 24 | Excess pressure inside a drop and bubble | Brijilal and Subramanian, <i>Elements of properties of matter</i> , S. Chand Limited, 1974 |

| Unit III | | |
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| Lecture Hour | Description | Reference with chapter |
| 25 | Introduction Kinetic theory of gases – basic postulates | M. W. Zemansky and R.H. Ditlman, <i>Heat and Thermodynamics</i> by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011 |
| 27 | Van Der Waal's equation of states | M. W. Zemansky and R.H. Ditlman, <i>Heat and Thermodynamics</i> by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011 |
| 28 | Pressure of an ideal gas, RMS speed | M. W. Zemansky and R.H. Ditlman, <i>Heat and Thermodynamics</i> by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011 |
| 29 | Laws of thermodynamics | M. W. Zemansky and R.H. Ditlman, <i>Heat and Thermodynamics</i> by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011 |
| 30 | Entropy – change of entropy in reversible | M. W. Zemansky and R.H. Ditlman, <i>Heat and Thermodynamics</i> by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011 |
| 31 | Entropy – change of entropy in irreversible processes | M. W. Zemansky and R.H. Ditlman, <i>Heat and</i> |

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| | | <i>Thermodynamics</i> by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011 |
| 32 | Low temperature: Joule – Kelvin effect | M. W. Zemansky and R.H. Ditlman, <i>Heat and Thermodynamics</i> by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011 |
| 33 | Joule – Kelvin effect, theory and applications | M. W. Zemansky and R.H. Ditlman, <i>Heat and Thermodynamics</i> by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011 |
| 34 | Liquefaction of gases | M. W. Zemansky and R.H. Ditlman, <i>Heat and Thermodynamics</i> by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011 |
| 35 | Linde’s process | M. W. Zemansky and R.H. Ditlman, <i>Heat and Thermodynamics</i> by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011 |
| 36 | Adiabatic demagnetization | M. W. Zemansky and R.H. Ditlman, <i>Heat and Thermodynamics</i> by adapted by Amit R. Chattopadhyay, Tata Mcgraw hill, 2011 |

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| | CYCLE TEST -II | Unit II and III |
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| Unit IV | | |
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| Lecture Hour | Description | Reference with chapter |
| 37 | Electric charge, conservation of charge – permittivity | Brijilal and Subramanian, <i>Elements of properties of matter</i> , S. Chand Limited, 1974 |
| 38 | Coulomb’s law –Electric field | Brijilal and Subramanian, <i>Elements of properties of matter</i> , S. Chand Limited, 1974 |

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| 39 | Electric potential | Brijilal and Subramanian, <i>Elements of properties of matter</i> , S. Chand Limited, 1974 |
| 40 | Gauss's law and its applications | Brijilal and Subramanian, <i>Elements of properties of matter</i> , S. Chand Limited, 1974 |
| 41 | Conductors – dielectrics | Brijilal and Subramanian, <i>Elements of properties of matter</i> , S. Chand Limited, 1974 |
| 42 | Electric current – Ohm's law | Brijilal and Subramanian, <i>Elements of properties of matter</i> , S. Chand Limited, 1974 |
| 43 | Magnetic induction – permeability - susceptibility | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 44 | Magnetic field due to a current carrying conductor | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 45 | Biot – Savart's law – field along the axis of a coil - force on a conductor carrying current in a magnetic field | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 46 | Ampere's circuital law - Faraday's law | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 47 | Gradient, Curl and Divergence | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |
| 48 | E - M waves - Maxwell's equations in free space | D. John Thiruvadigal, S. Ponnusamy, L. Sudha and M. Krishnamohan, <i>Physics for Technologists</i> , Vibrant Publication, 2013. |

| Unit V | | |
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| Lecture Hour | Description | Reference with chapter |
| 49 | Light and Optics - Fermat's principle | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |
| 50 | Laws of reflection and refraction | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |
| 51 | Total internal reflection and its illustrations | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |
| 52 | Mirrors and lenses | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |
| 53 | Lens formula | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |
| 54 | Combinations of thin lenses | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |
| 55 | Refraction through a prism - combination of two prisms | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |
| 56 | Dispersion without deviation | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |
| 57 | Deviation without dispersion | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |
| 58 | Defects of images | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |
| 59 | Coma distortion | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |
| 60 | Spherical and chromatic aberration in lenses. | R. K. Agarwal, Rekha Jain, Garima Jain, <i>Optics</i> by Krishna prakashan media Ltd., 2006 |

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| | MODEL EXAM | Unit I - V |
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