

Institute Level Elective Paper: Advanced Physics(ILE702)	
Teaching Scheme: Lectures : 3 hrs/week Practical : 2 hrs/week Credits: 4	Examination Scheme: Theory: (Mid Term : 30 marks, End Sem. Exam: 70 marks)
Course Objectives: To Teach few Fundamental Principles in Physics and their applications in the field of Engineering	
Unit 1 (8hrs) Laser: Einsteins a, b coefficients, spontaneous, stimulated emission, population inversion, meta stable state, characteristics of laser. Types of laser: He-Ne laser, Ruby laser, semiconductor laser, applications.	
Unit II(8hrs) Magnetic Properties : Diamagnetism and paramagnetism, quantum theory of paramagnetism, Ferromagnetism, Curie Weiss Law, temperature dependent of saturation magnetism, elementary ideas of ferri magnetism and antiferimagnetism.	
Unit III (8hrs) Nano Technology : Introduction to nanotechnology, Origin of Nano Technology, Nano Scale, Surface to volume ratio, quantum confinement, bottom up fabrication, sol-gel precipitation, applications of Nano Technology	
Unit IV(12hrs): Quantum Statistics and Solid state Physics : Statistics of distinguishable objects, Indistinguishable and exclusive particles, Maxwell Boltzman, Bose Einstein and Fermi Dirac distribution, comparison of the distribution laws (qualitative treatments). Metals and Insulators, Metallic conduction, Sommerfeld free electron model, Hall effect, electrons in periodic potential, effective mass and holes.	

Text Books:

- Perspectives of Modern Physics - by Arthur Beiser
- Introduction to Modern Physics - by Richtmyer - Kennard - Cooper
- Introduction to Solid State Physics - by Charles Kittel, Wiley India Pvt Ltd, 7th Edition.
- Modern Engineering Physics - by K. Vijay Kumar - Dr. S. Chandralingum
(Publication : S-chand and Company Ltd.)
- Engineering Physics - by R. K. Gaur and S.L. Gupta, Dhanpat Rai Publications.
- Text Book of Engineering Physics - by Kshirgar and Avadhanlu

Reference Books:

- Introduction to Nano Technology by Charles P. Poole, Jr. Frank J. Ownes, John Wiley and Sons.
- Introduction to Modern Physics - by Richtmyer - Kennard - Cooper (International publishers)
- Introduction to Solid State Physics - by Charles Kittel, Wiley India Pvt Ltd, 7th Edition.
- Optics - by Brijlal and Subramanun, S-Chand Publication.

Course Outcomes: At the end of the course the student is expected to understand:

1. Wave phenomenon exhibited by Electromagnetic radiations
2. Working principles of optical instruments
3. Fundamentals of lasers and its Engineering applications.
4. Foundation as well as comprehensive background of Quantum mechanics.
5. Fundamentals of Nano technology.