Optics

1. Light theory advance
   Historical view , wave and particle properties , Fermat's principle .
2. **Geometrical optics**
   Gaussian optics , Matrix in geometrical optics , translation matrix and reflection matrix , Lens power , amplification reflected surfaces .
3. **Aberration and different optical systems damage**
   Spherical aberration , Coma aberration , Astigmatism , curvature of field , Distortion , chromatic aberration .
4. **Polarization**
   Linear polarization , circular polarization , Polarization light generation by (a-reflection b-absorption c-scattering d-refraction) , light propagation through an isotropic media , properties of different directions , crystal optics properties of single optical axes , crystal optical properties of double optical axes , Interference of polarized light , optical activity , optical properties of induced polarization .
5. **Fourier Transformation and convolution**
6. **Interference**

Interference of light from two light sources , Michelson interferometer ,Twyman-Green interferometer , Multiple beam interference , Interference spectroscopy

7. **Diffraction**

Diffraction of a single slit, Fraunhofer diffraction , Fresnel diffraction , vector construction , diffraction maxima , circular aperture , Rayleigh's criterion , Fresnel integrals , Cornu spiral zone plate .

8. **Second order Non- linear susceptibility Tensor.**

Sum generation , second harmonic generation , Parametic amplification by difference generation , Parametric vibration .

9. **Phase Coincidence**
   Non ordinary scattering , double refraction .