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 medium, 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, Parametric amplification by difference generation, Parametric vibration.

9. Phase Coincidence
   Non ordinary scattering, double refraction.