SYLLLABUS: Junior Scientific Assistant (Photo) in FSL

Basic Principles of Forensic Science, Chronology and History or Development of Forensic Science in India. Role of Forensic Science in Indian Judiciary and laws related to Forensic Investigation in India like BNS, BNSS, BSA etc.; Methods of searching, collection, preservation and sampling of crime scene exhibits; Recording of crime scene; Detection and individualization of biological fluids like blood, semen, saliva, sweat, Urine, Feacal matters etc. Identification of skeletal remains through different methods including age and sex determination; Anti-mortem and Post-Mortem signs of deceased;

Classification of poisons, identification with different biological, chemical and physical methods; Classification of poisons, identification with different biological, chemical and physical methods; Chemical analysis of Arson and explosives exhibits; Classification of firearms, internal/external/terminal ballistics, Gunshot Residue (GSR) analysis, and tool mark examination. Types, History and different identification methods of Fingerprints examination. Handwriting characteristics, forgery types, ink analysis, and examination of indented, disguised hand writing.

Basic Principles and types of Simple and Compound Microscope, Elementary geometrical optics in the paraxial approximation. Refractive index; reflection and refraction at a plane boundary from Huygens' principle and Fermat's principle; Snell's Law; total internal reflection. Image formation by reflection at a spherical boundary; concave and convex mirrors. Real and virtual images Magnification.

Simple two-slit interference (restricted to slits of negligible width). The diffraction grating, its experimental arrangement; conditions for proper illumination. The dispersion of a diffraction grating. (The multiple-slit interference pattern and the resolution of a diffraction grating are excluded.) Fraunhofer diffraction by a single slit. The resolution of a simple lens.

Black body radiations, De Borglie waves. Photo-electric effect, Compton effect, wave-particle duality, Uncertainty principle and its applications (like - size of H-atom, zero point energy, wave packet, finite width of energy levels). Basics of Light sources, Mirrors, lens, Focal length, Image formation, Newton's laws on motion, Callers' law, Bernuli principals, Doppler's Principal and

effects. Photographic, Chromatic and spherical aberration, curvature of field, distortion and astigmatism,

Concept of Digital imaging, Concept of the megapixels, optical and digital zoom, image size, file size, concept of frame, perception and composition. Photographic camera types: Pin-hole, box, folding, large and medium format cameras, single lens reflex (SLR) and twin lens reflex (TLR), miniature, subminiature and instant camera, choice of camera and sizes, rising, falling, cross movements and swing back devices. Principal parts of Photographic cameras: (a) Lens (b) Aperture (c) Shutters, various types and their functions, focal plane shutter and in-between the lens shutter, shutter synchronization, self-timer; Direct vision and ground glass view finders, frame view finder, plane mirror and penta-prism view-finder, fresnel prism focusing, split image focusing, range finders and range finder focusing, mechanism focusing distance scale. Film chamber: Exposure counter, self-timer, tripod stand, panning tilt head, lens hood, cable release.

Fundamentals of Image Processing and Image Transforms and Basic Steps of Video Processing :- Digital Image fundamentals, Sampling and quantization of an Image, Relationship between pixels. Image Transforms: 2-D Discrete Fourier Transform, Properties, Discrete cosine Transform, Hadamard Transform. Analog video, Digital video, Time varying image formation model, Geometric image formation, formation, sampling of video signal. 2D Motion Estimation Optical flow, Pixel based motion estimation, Region based Motion estimation, Multi resolution motion estimation.

Digital Electronics, Python Programming, Data Structures, Data Story Telling and Visualization, Relational Database Management Systems, Mathematics for Machine Learning

Object Oriented Programming using Java, Microprocessor, Web Programming with Python, Operating Systems, and Artificial Intelligence

Machine Learning, Data Handling in Python, Cloud Computing, Computer Network, Network and Information Security, Internet of Things (IOT), and Introduction to Deep Learning