ANNEXURE I

TECHNICAL SPECIFICATION FOR OPTICAL METALLURGICAL MICROSCOPE

Essential Features:

- The required specifications are tabled as follows:

Technical Specifications:

INVERTED METALLURGICAL MICROSCOPE		
Sl. No.	**Part/Feature**	**Description**
01	**Microscope Frame**	• Rust-free and rigid metallic stand for reflected light illumination. • Rugged and sturdy stand with modular design for future upgradation to various techniques. • Trinocular tube with 100:0 split. • Objective nose-piece with a minimum of 6 Position for bright field, DIC or similiar and polarization studies.
02	**Sample Stage**	• Mechanical stage with a payload capacity of at least 4 kg, sufficiently large enough to inspect samples of dimension 80 mm (or higher) x 50 mm (or higher). XY movement by manual mechanical knob or automatic. • Travel range 80 mm (or higher) in X direction and 50 mm (or higher) in Y direction • Minimum of 3 stage-inserts must be provided to analyze samples of various dimensions ranging between 1 - 25 mm.
03	**Focus**	• 3 step Z-focus including: coarse, medium and fine in manual or automatic mode. • Adjustable knobs for focus setting with Torque adjustment.
04	**Attachment for various analysis**	• Observation Mode: Brightfield (BF), Polarizer and analyzer, Differential Interface contrast (DIC) or similiar. • Polarizer Can be plugged into 3 different click stops 0° (east-west), 45° (diagonal), 90° (north-south) and analyzer. • Slot for above observations • Manual BF selection • Manual field stop and aperture stop.
05	**Observation Tube**	• Eyepiece Pair • Magnification:10x • Field of View: 22 mm or better
06	**Light Source**	• 20 W or better LED Light source • Min. Life span: 50,000 working hours

07	**Objective nose piece**	• Revolving Nosepiece to accommodate a minimum of 6 objective lens.
08	**Objectives**	• Achromat grade objective (or better) 5X– with numerical aperture (NA) of 0.1 or better • Achromat grade objective (or better) 10X- with NA 0.2 or better • Semi apochromatic grade objective (or better) 20X – with NA 0.5 or better • Semi apochromatic grade objective (or better) 50X- with NA 0.8 or better • Semi apochromatic grade objective (or better) 100X- with NA 0.9 or better Suitable for Bright Field, Polarization, DIC or similiar
09	**Digital Color Microscope Camera**	• 5MP Digital Color CCD/ CMOS camera microcopy camera or better • Video Capture: 15 – 45 fbs as per the binning factor • Speed- 30 fps or better • Pixel Size: 2.3 µm x 2.3µm or better • USB 2.0/3.0 Connectivity
10	**Basic Measurement Software**	An integrated software with the following key specifications: • Software must have provision for basic image acquisition and movie acquisition, report creation (MS Word, and MS Excel formats) and basic image measurement functions. • Software must have basic image editing tool such as crop, resize, sharpening, color adjustment, background filter, etc. • Calibration option must be available to map various magnifications (either manual or automatic). • Software should capable of light-settings, to contrasting methods, magnification and exposure time can be saved and easily retrieved for exact duplication. Details such as bias of DIC, exact position of the Excitation Manager in fluorescence and binning mode of the camera should completely reproducible for ensuring that samples can be compared under exactly the same conditions.
OTHER MANDATORY TERMS AND CONDITIONS		
1	**Software**	• The software should be compatible with the latest versions of windows operating system (minimum windows 10). Up-gradation of software free for 5 years, if required.
2	**Warranty period**	• Warranty for 12 months from the date of installation/commissioning.
3	**Installation**	• Installation should be done by factory trained engineers at our institute, free of charge. • Operation, service and maintenance training should be provided to at least five persons for a minimum of two

		days. • Sample for training must be provided by the supplier • One set of maintenance and operating manuals in English (with a hard copy)
4	**GST**	• The offer should be made @ 5 % GST against a concessional GST certificate.
5	**Delivery condition**	• Equipment to be delivered in test ready, factory calibrated condition.
6	**Other Conditions**	• The manufacturer of Microscope, Camera and Software should be same. • The competitor must be either OEM or authorized dealer of the OEM of the proposed equipment in India. In case of authorized dealer, a valid original certificate provided by the original manufacturer in the name of IIT Madras to be sent along with quote. • The proposed supplier should ensure that the similar optical microscope systems of same manufacturer have been supplied to at least 3 IITs or 5 NITs or 7 national government research organizations. A list of such clients in the last five years must be provided along with the contact person of the institute to whom the equipment has been supplied. • Attractive discount for an educational institution should be offered. • Separate prices should be shown for (a) basic equipment (b) essential accessories (c) optional accessories (d) normal spares particulars of the items which are likely to sustain damage or failure in use. • Support of hardware and spares for 10 years and more after the End of life of the model • The firm should be equipped with well-trained engineers to offer post warranty maintenance and service support. • Details of service support in India that the firm can offer should be given. • The nearest service center is to be mentioned.
7	**Compliance statement**	• Compliance statement needs to be provided clearly specifying COMPLY/NON-COMPLY with remarks/reasons of all of the points mentioned above.
OPTIONAL REQUIREMENTS		
1	**Advanced Software Version**	• The vendor should provide the quote for advanced software (as individual or collective) which should have provision for: Grain size measurement Phase analysis Interactive measurement Extended Annotation • The quotation/price of this software should be valid upto a duration of 1 year.

2	**Computer**	The vendor should provide the quote for a suitable PC, Monitor and related accesorries (including UPS) compatible for the microscope, software , camera etc.
3	**AMC**	• An offer for 3 years AMC after the warranty period clearly indicating the scope of the AMC must be quoted separately.