



Advertisement for the Post of Junior Research Fellow

Advt. No.: IIITDMK/PR/JRF/A19/2025

Date: 23.06.2025

Applications are invited for the following post. The post is purely on a contractual basis.

Name of Position	JUNIOR RESEARCH FELLOW
Number of Positions	One
Nature of Work	Research and Development
Duration of the Project	Three Years
Duration of the Position	The post is purely on a contractual basis and initially the post is for 1 Year. May be extended further.
Other Benefits	The selected candidates can register for the PhD degree at IIITDM Kancheepuram as per Institute rules. However, s(he) needs to apply for a PhD position when the advertisement is open.
Stipend	Rs. 37,000- pm + 30% HRA <i>Note: 30% HRA will be paid if no accommodation is provided by the Institute.</i>
Title of the Sponsored Project	Prototype Design and Validation of a Handheld Polarization Imaging Probe for Early Detection of Precancerous Cervical Cancer Lesions Using Mueller Matrix Polarimetry and Machine Learning: A Pilot Study
Funding Agency	ANRF- PMEERG
P.I / Co-P.I	Dr. Pal Uttam Mrinal /-
Department	Electronics and Communication Engineering
Educational Qualification	PG degree (MSc/ME/M.Tech.) in any specialization of Electronics and Communication Engineering / Electrical Engineering / Electrical and Electronics Engineering / Electronics and Instrumentation Engineering / Instrumentation Control / Physics (including Laser Optics, Photonics, Optical Fibers) / any allied branches.

Additional Qualification (Desirable, if any)	<p>(OR)</p> <p>UG degree (B.E/B.Tech) in Electronics and Communication Engineering / Electrical Engineering / Electronics and Instrumentation Engineering / Instrumentation Control / any allied branches.</p> <p>Prior experience in optical design of imaging systems including polarization basics, lens selection, field of view, working distance, and numerical aperture calculations. Prior experience in designing medical imaging systems will be preferred.</p> <p>Prior experience in Ray Optics Simulation using softwares such as ZEMAX and COMSOL will be preferred.</p> <p>Well versant in Python libraries: Open CV, Media Pipe, Tkinter and integration of real-time AI model with industrial machine vision cameras.</p>
Age Limit	35 years as on Last date of receiving the application (Age relaxation is applicable as per Gol norms)
Interview Schedule: Date, Time & Venue	Written test at 10.00 am & Interview at 2.00 pm IIITDM Kancheepuram, Admin Building on 18.7.2025.

How to Apply and Selection Procedure:

1. Interested candidates are requested to submit their applications online (<https://forms.gle/n7Qd1vRSScBxTir56>)
2. Also, take print of the application form, fill, sign, and submit the hard copy at the time of Interview.
3. Candidates should be present physically at 9.30am on 18.7.2025 at IIITDM Kancheepuram located at Chennai - 600127 for the written test and interview.
4. Candidates should produce all educational and experience certificates at the time of interview for verification.
5. No TA/DA will be paid for attending the interview.
6. The selection process consists of written test followed by Interview. The topic for written test along with syllabus is enclosed.

For any clarification regarding the application process, the candidate may contact the PI. email: uttampal@iiitdm.ac.in

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Syllabus for the Junior Research Fellow

Engineering Mathematics:

Linear Algebra: Vector space, basis, linear dependence and independence, matrix algebra, Eigen values and eigen vectors, rank, solution of linear equations- existence and uniqueness.

Calculus: Mean value theorems, theorems of integral calculus, evaluation of definite and improper integrals, partial derivatives, maxima and minima, multiple integrals, line, surface and volume integrals, Taylor series.

Differential Equations: First order equations (linear and nonlinear), higher order linear differential equations, Cauchy's and Euler's equations, methods of solution using variation of parameters, complementary function and particular integral, partial differential equations, variable separable method, initial and boundary value problems.

Vector Analysis: Vectors in plane and space, vector operations, gradient, divergence and curl, Gauss's, Green's and Stokes' theorems.

Complex Analysis: Analytic functions, Cauchy's integral theorem, Cauchy's integral formula, sequences, series, convergence tests, Taylor and Laurent series, residue theorem.

Probability and Statistics: Mean, median, mode, standard deviation, combinatorial probability, probability distributions, binomial distribution, Poisson distribution, exponential distribution, normal distribution, joint and conditional probability.

Network Theory:

Circuit Analysis: Node and mesh analysis, superposition, Thevenin's theorem, Norton's theorem, reciprocity. Sinusoidal steady state analysis: phasors, complex power, maximum power transfer. Time and frequency domain analysis of linear circuits: RL, RC and RLC circuits, solution of network equations using Laplace transform.

Signal and Systems:

Linear Time-Invariant (LTI) Systems: definitions and properties; causality, stability, impulse response, convolution, poles and zeros, parallel and cascade structure, frequency response, group delay, phase delay. Signal transmission through LTI systems.

Analog Circuits:

Diode Circuits: clipping, clamping and rectifiers. BJT and MOSFET Amplifiers: biasing, ac coupling, small signal analysis, frequency response. Current mirrors and differential amplifiers. Op-amp Circuits: Amplifiers, summers, differentiators, integrators, active filters, Schmitt triggers and oscillators.

Electromagnetics:

Maxwell's Equations: differential and integral forms and their interpretation, boundary conditions, wave equation, Poynting vector. Plane Waves and Properties: reflection and refraction, polarization, phase and

group velocity, propagation through various media, skin depth. Rectangular and circular waveguides, light propagation in optical fibers, dipole and monopole antennas, linear antenna arrays.

Medical Imaging Systems:

Basic physics, Instrumentation and image formation techniques in medical imaging modalities such as X-Ray, Computed Tomography, Single Photon Emission Computed Tomography, Positron Emission Tomography, Magnetic Resonance Imaging, Ultrasound.

Sensors and Bioinstrumentation:

Sensors - resistive, capacitive, inductive, piezoelectric, Hall effect, electro chemical, optical; Sensor signal conditioning circuits; application of LASER in sensing and therapy. Origin of bio potentials and their measurement techniques - ECG, EEG, EMG, ERG, EOG, GSR, PCG, Principles of measuring blood pressure, body temperature, volume and flow in arteries, veins and tissues, respiratory measurements and cardiac output measurement. Operating principle of medical equipment- cardiac pacemaker, pulse oximeter, hemodialyzer, electrical Isolation (optical and electrical) and Safety of Biomedical Instruments.



Appl. No.:
(will be filled by Office)

APPLICATION FOR THE POSITION OF PROJECT STAFF

Candidates Photo
to be pasted here

1. Advertisement Number:
2. Name of the Post:
3. Candidate's Full Name (As per SSLC Mark sheet):
4. Father's Name of the Candidate:
5. Date of Birth of the Candidate:
6. Nationality:
7. Gender:
8. Category (Gen / OBC / SC / ST):
(For age relaxation only)
9. Address for Communication:
10. Permanent Address:
11. Contact Phone / Mobile Number(s):

12. Email Address:

13. Educational Qualifications Starting from Xth / SSLC:

Sl. No.	Degree & Branch	Institute / University	Year of Entry & leaving	Percentage / CGPA & Class	Mode (Regular / Part-time / etc.)

14. Academic Record: GATE/ CSIR - NET qualification details with percent marks / Rank, year of qualifying, etc.:

15. Names and addresses of two referees along with phone numbers and e-mail addresses:

a)

b)

16. Are you currently working in Central / State / Semi-Govt / PSU / Autonomous Bodies of the Govt.? (If yes, please submit NOC issued by your present employer):

17. Present Position / Designation:

18. Work Experience (in reverse chronological order including post held at present):

Sl. No.	Organization	Designation	Start Date & End Date	Pay Scale / Total Pay

19. If selected, time required to join:

20. Any other information you wish to mention:

UNDERTAKING

I hereby declare that I have carefully read and understood the instructions given in the Advertisement. All information furnished in this form as well as the attached documents are true and correct to the best of my knowledge and belief. I fully understand that if it is found at a later date that any information given in the application is incorrect / false or if I do not satisfy the eligibility criteria, my candidature / appointment is liable to be canceled / terminated.

Signature of the Applicant

Date: