(This version of Annexure-1 supersedes all previous versions of Annexure-1 released during this advertisement period. Applicants shall always ensure that they are referring to the current version of this Annexure -1, posted on https://facapp.iitm.ac.in/2026ra /).

IIT Madras – Faculty Recruitment

Specialization Areas

Advt.No.IITM/R/1/2026 Dt 27.02.2026

Department-wise specific qualification requirement (if any), and areas of specialization sought are detailed in the table below. Candidates must clearly demonstrate their capability in the specialization area(s).

SNo	Department	Specific Qualification Requirement	Specialization Area
1	**Aerospace Engineering**	Candidates must clearly demonstrate their capability in the specialization area applied for through publications in relevant reputed journals and have aero background as detailed below: At least one degree (Bachelor's / Master's / Ph.D.) in Aerospace (Aero.) Engineering. (OR) At least 3 years teaching experience in handling undergraduate / graduate level courses related to Aerodynamics / Flight Mechanics / Aerospace Propulsion / Aerospace Structures in an Aero. Engineering department at an IIT / IIST Trivandrum / reputed university abroad. (OR) Ph.D. thesis relevant to Aero. Engineering and awarded by a university without an Aero. Engineering department.	(i) Airplane Design (ii) Airplane Aerodynamics (iii) Experimental structural mechanics (iv) Structural Dynamics (experimental background preferred) (v) Advanced Manufacturing of Aerospace Structures. (vi) Avionics & sensors for aerospace applications (with hardware background) (vii) Air Traffic Management.
2	**Applied Mechanics and Biomedical Engineering**	(a) At least one pre-PhD engineering degree (at the bachelor's or master's level) (b) Post-doc research experience preferred	Specialization Area*
	* The department specializes in interdisciplinary research that broadly spans the fields of Solid Mechanics, Fluid Mechanics, and Biomedical Engineering. Applications are invited from candidates with strong engineering acumen and an interdisciplinary focus in addressing contemporary critical challenges that fits into at least one of the following specializations: (i) **Computational Solid Mechanics** focussing on cutting-edge methodologies that bridge solid mechanics and scientific computing, addressing fundamental challenges in areas such as multiscale/multiphysics modelling, phase field and nonlocal approaches to failure, advanced discretization methods, and the integration of physics-informed machine learning with rigorous mechanics-based modelling. (ii) **Topology Optimization** integrating active material mechanics for multifunctional adaptive systems. (iii) **Experimental thermal–fluid science** with a preference for research relevant to clean energy systems, advanced cooling technologies, micro-gravity environments or micro & modular nuclear reactors. (iv) **AI-driven algorithm** development for fluid mechanics.		

	(v) **Medical Instrumentation and Biomedical Signal/Image Processing:** Novel clinical measurement and imaging systems (electrophysiology, clinical imaging modalities, surgical and interventional instruments) and the processing of physiological recordings (EEG, EMG, ECG, evoked potentials) and in vivo medical images for diagnosis, monitoring, surgical planning, and rehabilitation tracking. (vi) **Physiological Systems Modelling:** Computational and data-driven models of organ-system physiology (cardiovascular, musculoskeletal, respiratory) useful for patient-level prediction or control. Both mechanistic modelling and work at the interface of control theory and physiological regulation are encouraged. (vii) **Data Science for Biomedical Engineering:** AI/ML, IoT, and immersive technologies (VR/AR/MR) applied to real-world hospital and clinical workflows: patient monitoring, clinical decision support, outcome prediction, and surgical training. The emphasis is on tools that go beyond proof-of-concept, with real clinical data and deployment in practice.		
3	**Biotechnology**	a) Ph.D. in Biological Sciences with a minimum of three years postdoctoral experience in at least one of the cancer biology research areas specified.	***(i) Experimental cancer biology*** *The prospective applicant is expected to establish a research group focused on addressing fundamental questions in understanding of the molecular genetic mechanisms of cancer progression / tumour-immune cell cross-talk / cancer metabolism. Expertise in using animal models and/or human primary cancer tissue samples to address these questions, evidenced by peer reviewed publications, is essential. In addition, the candidate must have demonstrated expertise with cutting-edge high-throughput technologies such as gene editing, genomics, proteomics, and metabolomics.* *Ability to complement the existing strengths in the department is desirable.*
		b) BE / BTech in Chemical Engineering (preferably) / Biochemical Engineering / Biotechnology / Materials Science and Engineering / Equivalent and a Ph.D. and post-doctoral experience in any of the relevant domains.	***(ii) Biomaterials Engineering*** *The prospective applicant must demonstrate their domain expertise in designing biomaterials in at least one of the following areas, supported by peer-reviewed publications and/or granted patents.* *2.1) Biomaterials for immunotherapy/immunoengineering (or) delivery of immuno-therapeutics* *2.2) Computational design of biomaterials* *2.3) Materiomics for tissue engineering*
		c) BE / BTech in Chemical Engineering (preferably) / Biochemical Engineering / Biotechnology / equivalent and a Ph.D. and postdoctoral (academia or industry) experience in any of the relevant domains.	*(iii)* ***Synthetic biology for green manufacturing/Downstream processing for recombinant therapeutics or biologics/Bioprocess modelling, control and simulation*** *The prospective applicant must demonstrate experimental expertise in at least one of the following specializations; relevant industry experience would also be valued* *3.1) Synthetic biology/Metabolic engineering/Strain development through adaptive laboratory approaches and Bioprocess development for green manufacturing of industrial metabolites/recombinant proteins*

	Biotechnology		*3.2) Mammalian synthetic biology/cell-line engineering for novel biotherapeutic modalities such as cell and gene therapy* *3.3) Downstream process development for recombinant proteins or biologics/Development of analytical techniques for biologics quality measurement and monitoring* *3.4) Modeling, simulation and control of bioprocesses (Upstream and/or downstream) /Development of Bioprocess Process Analytical and/or real-time monitoring technologies / Bioreactor modelling and scale-up including computational fluid dynamics analysis / Data-driven decision making in bioprocess optimization and automation / Autonomous biomanufacturing*
		d) PhD in Neuroscience (preferably)/ biological sciences or equivalent. A minimum of three years postdoctoral experience with a strong track record of publications in the specified area of Neurobiology.	***(iv) Systems Neuroscience:*** *The prospective applicant must demonstrate domain expertise in investigating neuronal circuit function and its relation to behaviour using animal models (preferably mice, rats or zebrafish)*
		e) BSc/MSc/BS/MS in Physics/Chemistry/Biological Sciences or BE/BTech/MTech in any branch of science and engineering and a Ph.D. and post-doctoral experience in any of the relevant domains.	***(v) Super-resolution and single-molecule imaging*** *The prospective applicant is expected to demonstrate capability in using super-resolution (SR) imaging or single-molecule (SM) imaging and image analysis techniques for addressing questions related to various areas of life science, medicine, and bioengineering. These include (but are not limited to) developmental biology, disease biology, host-pathogen interactions, neuroscience, plant biology, condensate biology, genome biology, mechanobiology and others. Applicant must have expertise in developing/using SR/SM microscopy platforms with image analysis pipelines for quantitative biology, evidenced by peer-reviewed publications. Additional experience in life-time based quantitative imaging is desirable.*
		f) BE/B.Tech. degree in Computer Science/Data Science/Artificial Intelligence/Biotechnology or BS/B.Sc. Mathematics, with a PhD in Computer Science/Computational Biology/Data Science/Artificial Intelligence.	***(vi) AI-Driven Computational Multi-omics*** *Candidates must have strong foundations in algorithm design, statistical modelling, machine learning, and large-scale data analysis, with demonstrated expertise in one or more of the following: genomics, transcriptomics (including single cell and spatial transcriptomics), epigenomics, or multi-omics research. Experience in developing foundational AI models or advanced computational frameworks for next-generation sequencing data with significant contributions to disease genomics, systems*

			genetics, or population-scale omics studies, is highly desirable. We seek individuals capable of leading independent and collaborative research programs at the intersection of AI, computation, and biological discovery.
	Biotechnology	g) PhD in biological sciences with a minimum of three years postdoctoral experience in developmental biology. The candidate must have excellent scholastic record at both school and university levels with outstanding publications from both PhD and postdoctoral research.	***(vii) Developmental Biology*** *The prospective applicant must be experienced in investigating development-related problems using any of the established model organisms. The applicant is expected to establish an independent research group focused on fundamental questions(s) in developmental biology.*
4	**Chemistry**	a) Applicants must have their basic degrees in B.Sc. and M. Sc. (or M.S. as applicable) with Chemistry as the major subject of study and a Ph.D. degree in the field of Chemistry b) A minimum of three years of active postdoctoral research experience c) Teaching Requirement: Applicant should be able to teach UG and PG courses both at the core and elective levels of the respective chosen section [(i) – (iv) Organic Chemistry / (v) - (viii) Physical & Theoretical Chemistry / (ix) & (x) Inorganic Chemistry].	(i) Synthetic Carbohydrate Chemistry (Synthesis and function) (ii) Experimental Chemical Biology (Molecular-level Probing of Cellular Function) (iii) Experimental Medicinal Chemistry (Chemical Synthesis and Biological Evaluation of Small Molecules) (iv) Physical Organic Chemistry (Advancing fundamental aspects of chemical structure and reactivity, reaction mechanism, and molecular interactions) (v) Ultra-fast optical spectroscopy (With demonstrated expertise in building instrumentation for applications in materials/biological systems/gas-phase chemistry) (vi) Nuclear Magnetic Resonance spectroscopy with expertise in methodology development for applications in biological/materials systems. (vii) Electroanalytical chemistry (With applications in bio-electrochemistry/single-entity sensing/molecular rectifiers) viii) Multiscale modelling across time and length scales with demonstrated expertise in method development. (ix) Bioinorganic Chemistry-Heme systems and related materials (x) Functional Molecular Materials of d-Block Elements
5	**Civil Engineering**	Basic degree in Civil Engineering* PhD specialization in any of the specified areas. Candidates with basic degree in architecture will also be considered in the following area: Building science and indoor comfort	(i) Building technology, construction materials, and management a) Building science and indoor comfort b) Long-term performance of concrete

		One degree in Civil Engineering*, Master's or Ph.D. thesis in the areas of Pavement Engineering or Transportation Systems Engineering *Exceptional candidates with a degree in allied areas may be considered	(ii) All areas of traffic engineering and transportation planning, preferably with specialization in: a) Transportation Economics b) Emerging Mobility Technologies (e.g., mobility-on-demand, electric vehicles, connected autonomous vehicles, etc.) and Public Transport c) Digital transportation infrastructure (e.g., AI and ML in Transportation, Internet of Things, Digital Twin, large-scale computing in transportation, etc.) d) Traffic Safety, Mobility and Health, and Human Factors e) Modeling and Control of traffic and pedestrian systems (All areas within Pavement Engineering or a closely allied discipline relevant to pavement materials, design, construction, and performance)

<table>
<tr><td rowspan="2">6</td><td>Computer Science & Engineering</td><td>Specific Qualification*</td><td>All areas of Computer Science and Engineering</td></tr>
<tr><td colspan="3">Specific Qualification*
Bachelor’s Degree: Candidates must have an engineering degree in Computer Science / Computer Science and Engineering/ Computer Engineering.
Master’s Degree: Candidates must hold a master’s degree in engineering from Computer Science / Computer Science and Engineering/ Computer Engineering program. [This may be waived if the candidate was admitted to a direct Ph.D. program after the Bachelor’s degree.]
Ph.D. Degree: Must be in Computer Science/ Computer Science and Engineering/ Computer Engineering.
Applications of candidates with deviations from the above qualification areas may be considered if they have an exceptionally good record of publications in areas related to Computer Science and Engineering.</td></tr>
<tr><td>7</td><td>Chemical Engineering</td><td>At least one degree in Chemical Engineering.

The candidate must have demonstrated a strong research record, with a clear research vision in one or more of the areas.</td><td>(i) Biological Engineering: The relevant expertise includes: Protein and enzyme engineering; Microfluidics/MEMS and single-cell systems; Biopharmaceuticals and advanced biologics; Plant and agricultural bioengineering; Sustainable biomanufacturing and bio-based materials.
(ii) Systems Biology: The relevant expertise includes Mechanistic / multiscale modeling of biological networks; Data-integrated modeling and control; Computational biochemical and pharmaceutical systems; Microphysiological systems and organoids; Systems immunoengineering.
(iii) Process Systems Engineering / Control: The relevant expertise includes Process design, control and/or process safety, grounded in classical chemical engineering; AI/ML-enabled decision-making / optimization; human–machine interfaces; Digital twins leveraging real-time sensor data.
(iv) Environmental Engineering: The relevant expertise includes Environmental sensing and monitoring; Environmental toxicology; Large scale ecological systems modeling.
(v) Catalysis / Reaction Engineering / Process Development for Clean Energy Transition and Circularity: The relevant expertise includes Discovery or Engineering of novel catalytic materials, electrolytes, and/or molecules; Electrification of chemical processes; Process design and development. The department is looking for candidates with research focus on clean energy transition (such as, hydrogen, ammonia, net-zero tech, etc.).</td></tr>
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8	**Data Science and Artificial Intelligence**	a) Candidates must clearly demonstrate their capability in the specialization area applied for through publications in relevant reputed venues **and** b) PhD in Engineering / Sciences	(i) Computer Vision (ii) Natural Language Processing (iii) Speech Technologies (iv) Agent-Based AI (v) Theoretical Machine Learning (vi) Computer Systems for AI & ML (vii) Autonomous systems viii) AI for Systems and Control (ix) Quantum ML (x) Foundation Models and Generative AI (xi) Causal Inference (xii) AI for healthcare xiii) Responsible AI xiv) AI for Science
9	**Electrical Engineering**	a) Candidates must have at least one degree in Electrical Engineering. (OR) b) Candidates may have degrees in Computer Science and Engineering / Physics, however, they must have a strong research record in the areas of interest to the Department of Electrical Engineering.	(i) Speech signal processing and NLP, Radar signal processing, Theory for deep learning, foundation models and adversarial models, Quantum information theory (ii) MEMS technology; Wide bandgap semiconductor device technology; Emerging device technologies for computing and communication applications; AI/ML based modeling of semiconductor devices and processes. (iii) Electronic System Design — Advanced hardware systems with strong industrial engagement and translational impact. Biomedical Instrumentation — Medical device and applied instrumentation development with clinical validation and translational outcomes. (iv) Experimental work in RF systems (i.e. GHz to sub THz) with a preference for radar systems, phased array antenna systems, and reconfigurable metasurfaces; Optical communications & Networks with expertise in related signal processing and machine learning techniques; Experimental work in quantum computing systems & quantum communication systems. (v) Analog, Mixed-Signal and RF IC design with tapeout and testing experience; Digital systems design and architecture; Electronic Design Automation for IC Design.
10	**Engineering Design** (Candidates should clearly indicate the area code that they are	a) Bachelor's degree in an Engineering discipline and should have clearly demonstrated domain expertise in Automotive Engineering through the PhD or Post-Doctoral research work.	(i) Automotive Engineering: Candidates with demonstrated research experience during PhD or Post-Doctoral Fellowship in the following areas: 1.1) Sensor Technology with demonstrated application to Autonomous Road Vehicle Design. 1.2) Two-Wheeled Road Vehicle Design. 1.3) Battery Technology with demonstrated application to Electric Road Vehicle Design.

	applying for: 1.1, 1.2, 1.3,1.4,1.5, 2.1, 2.2, 2.3, 2.4, 3.1,3.2, 4.1, 4.2,4.3, 4.4).		1.4) Electric Machine Design with demonstrated application to Electric Road Vehicle Design (Individual with demonstrated experience in Electric Machine Control aligning with this area is also welcome to apply). 1.5) Software Defined Vehicles with demonstrated application to Road Vehicle Design.
		b) Bachelor's degree in Engineering Design / Electrical / Electronics / Instrumentation / Mechanical / Biomedical Engg/Medicine (MBBS)	(ii) Biomedical Device Design and Development: Demonstrated research experience during PhD or Post-Doctoral Fellowship, in developing hardware for the following applications - 2.1) Prosthetics and Implants 2.2) Medical Imaging Technology 2.3) Wearable Diagnostic Devices 2.4) Critical Care Devices
		c) Bachelor's degree in an Engineering discipline and should have clearly demonstrated domain expertise in Robotics Engineering through the PhD or Post-Doctoral research work	(iii) Robotics: Demonstrated research experience during Ph.D. or Post-Doctoral Fellowship in the following areas: 3.1) Design and implementation of control for soft robots, continuum robots, and legged locomotion 3.2) Autonomous manipulation: Application of machine learning for autonomous manipulation/grasping. Applicants should have strong background in Reinforcement Learning with hardware validation and.
		d) Bachelor's degree in Engineering Design / Electrical /Electronics/ Mechanical / Production / Design / Computer Science and Engineering / Industrial Engineering	(iv) Computational and Product Design: 4.1) Demonstrated research experience during PhD or Post-Doctoral Fellowship (including computational approaches) in Human Factors / Form Design / Aesthetics / Interaction Design 4.2) Demonstrated research experience during PhD or Post-Doctoral Fellowship in applied topology optimization / biomimetic design. 4.3) Demonstrated research experience during Ph.D or Post-Doctoral Fellowship in application of AI for Engineering Design/Manufacturing. 4.4) Demonstrated research experience during Ph.D or post-doctoral fellowship in application of Augmented Reality/Virtual Reality/Mixed Reality for Engineering Design/Manufacturing.
	Research experience in the advertised areas during PhD or Post-Doctoral Fellowship should be clearly demonstrated by the candidate through appropriate publications as the First Author.		
11	**Humanities & Social Sciences**	PhD in relevant areas of specialization	(i) IKS (Yoga, Vedanta, Vyakarana, Tarka, Ayurveda, Sanskrit Language and Literature) (ii) Economics: Economic Theory (Macroeconomics; Game Theory; Behavioral and Experimental Economics; Financial Economics; Econometric Theory)
12	**Management Studies**	a) PhD/Doctoral research in relevant areas	(i) Finance: Quantitative Finance

			(ii) Operations: AI and ML driven supply chain modelling (iii) Marketing: 3.1 AI in Marketing 3.2 Neuro and Sensory Marketing (iv) Information systems (v) Strategy and Integrative Management: 5.1 Global Corporate Strategy 5.2 Technology Foresight Studies 5.3 AI-Based Competitive Strategy
13	**Mechanical Engineering**	Any one degree in Mechanical Engineering	(i) Biomechanical Engineering (ii) Robotics/ Control & Automation in Manufacturing (iii) Fabrication and Material Processing for Electronics/ Semiconductors (iv) Non-Destructive Evaluation (NDE) (v) For women candidates with an excellent track record, any area of specialization can be considered
		For women candidates with an excellent track record, any area of specialization can be considered	
14	**Medical Sciences and Technology**	a) Applicants must have earned a doctorate in Medicine/Engineering; b) A minimum of two years of research experience in a medical school or comparable clinical research environment conducting relevant work is preferred. c) Must demonstrate an excellent publication record; exhibit potential to lead and establish a strong externally sponsored research program; and must be committed to excellence in teaching at both undergraduate and graduate levels d) For Area (iv) – Diabetes-Focused Medical Devices and Therapeutic Technologies: Demonstrated experience in technology commercialization, intellectual property generation, clinical collaboration, and/or engagement with medical device start-ups is expected. e) For Area (v) : Mechanobiology and Advanced Electron Microscopy Experience in developing or applying quantitative approaches for structural and cellular investigations will be considered an advantage.	(i) **Mathematical Modelling of Physiological Systems:** Advanced computational and systems-level modelling of physiological processes with demonstrated clinical relevance and translational implications (ii) **Medical Robotics:** Design, development, and clinical deployment of medical robotic systems. Applicants must demonstrate a proven track record of engineered systems validated in clinical environments (iii) **Biomedical Product Development:** End-to-end medical product development with demonstrated clinical collaboration. Evidence of translation from concept to validated prototype or deployed solution is expected. (iv) **Diabetes-Focused Medical Devices and Therapeutic Technologies:** Design and development of diabetes-related medical devices and sensors, including but not limited to: • Insulin delivery systems • Closed-loop diabetes management systems • Implantable or non-invasive glucose sensing technologies (v) **Mechanobiology and Advanced Electron Microscopy:** Proven research experience in mechanobiology with a strong background in force measurements and mechanotransduction. Demonstrated expertise in quantitative image analysis, particularly using electron microscopy based techniques, is required.

			Applicants must possess hands-on experience with both hardware and software associated with advanced cryogenic electron microscopy techniques, including Cryo-EM, cryogenic lift-out methods, and cryo-electron tomography.
15	**Metallurgical and Materials Engineering**	a) Ph.D. with excellent academic record with first class or equivalent at all the preceding degrees b) Minimum of two years of postdoctoral or industrial experience in the advertised area At least one degree (Bachelor's or Master's degree) in Metallurgical or Materials Engineering	(i) Solid-state quantum / Spintronic / memory **devices** with demonstrated experience in device fabrication and integration
	Candidates should demonstrate their expertise in the advertised research areas through high quality research publications as first author or corresponding author. Candidates should clearly indicate their area of specialization from the above-mentioned research areas in the application.		
16	**Ocean Engineering**	Ph.D relevant to Ocean Engineering / Naval architecture. Possess an excellent academic record with a first degree in engineering in Naval Architecture/Civil/Ocean Engineering. Should be NA + expertise Should be CE/ OE + expertise	(i) **Naval architecture:** Ship structures; Ship structural design & Ship building; Recent techniques in ship design & construction; Ship machinery & systems; Autonomous and Green ships; Marine Engineering. **(ii) Ocean Engineering:** Offshore structure; Harbour & Coastal structures; Coastal Engineering; Offshore and Deepwater Engineering; Waterway and Port engineering.
17	**Physics**	a) Candidates should have a PhD in Physics or in any closely related disciplines. If Ph.D is in a closely related discipline, at least one degree (Bachelors or Masters) should be in Physics. b) Candidates should have at least three years of industrial, research, or teaching experience after Ph.D.	(i) **Experimental high-energy nuclear and particle physics:** We seek applicants working in the area of experimental high-energy nuclear and particle physics. Applicants are expected to have a strong track record working in experimental collaborations or with generic R&D for particle-detector instrumentation. The experimental group at IITM works primarily on the CMS and Belle II experiments, with additional interest in generic instrumentation R&D, EIC, CBM and BESIII. Significant expertise already exists in the sub-areas of flavour physics, Higgs physics, heavy-ion collisions, and detector development. The successful applicant would be expected to introduce complementary expertise to reinforce the group's activities. (ii) **Experimental Quantum Optics:** Seeking candidates to establish a research group in experimental quantum optics in UV-visible-IR region. Research areas of interest include, but not limited to, quantum imaging and ghost spectroscopy with traditional as well as modern optical materials with experiments on photonics-based qubits and qudits. (iii) **Quantum Computing and Quantum Communications theory**

			Quantum Computing and Communications theory: Seeking candidates with expertise in the theory of quantum computing and quantum communications. Areas of expertise include (but not limited to) quantum algorithms, quantum simulations, quantum networks and communications theory, quantum information theory.
18	**School of Interdisciplinary Studies (SIDiS)**	Ph. D. in relevant fields	Time-resolved THz spectroscopy for quantum materials.