

IIT Madras - Faculty Recruitment - Specialization Area - (2021a)

Advt.No.IITM/R/1/2021 Dt.28.04.2021

Basic qualifications and experience for the post of **Assistant Professor** is available in the detailed advertisement at Section A & B. In addition to the basic qualifications and experience required for eligibility, applicants are expected to have an exceptional academic record. Department-wise areas of specialization advertised and specific qualification requirements (if any) are detailed in the table below:

SNo	Department	Specific Qualification Requirement	Specialization Area
1	Aerospace	Specific Qualification*	(i) Airplane Design (ii) Airplane Aerodynamics (experimental background preferred) (iii) Experimental structural mechanics (iv) Advanced Manufacturing of Aerospace Structures (v) Artillery gun propellant combustion & internal ballistics of artillery gun (vi) Space electric propulsion and computational plasma flow dynamics with a good knowledge in machine learning
<p>*Candidates should have clear focus in one or more of the listed areas and have aero background as detailed below:</p> <ul style="list-style-type: none"> ● At least one degree (Bachelor's, Master's, Doctoral) in Aerospace Engineering. (OR) ● At least 3 years teaching experience in handling undergraduate / graduate level courses related to Aerodynamics / Flight Mechanics / Aircraft Propulsion / Aerospace Structures in an Aerospace Engineering department at an IIT / IIST Trivandrum / reputed university abroad. (OR) ● PhD thesis relevant to Aerospace Engineering and awarded by a university without an Aerospace Engineering department. 			
2	Applied Mechanics	A degree in Biomedical / Mechanical / Chemical / Electrical / Metallurgical / and with Experimental Background	(i) Emerging areas of Biomedical Engineering with emphasis in Biomaterials and Medical device development.
3	Chemistry	Candidates must have their basic degrees B.Sc. and M. Sc. (or M.S. as applicable) with chemistry as the major subject of study and Ph.D. degree in the field of chemistry.	(i) Theoretical chemistry with strong research background in quantum chemistry/optical / magnetic resonance spectroscopy. (ii) Physical Chemistry with expertise in one or more of the areas below: <ul style="list-style-type: none"> ● (Experimental and / or theoretical) biophysical chemistry, ● (Experimental and /or theoretical) chemical biology, and structural biology, ● Materials science with expertise in developing computational codes (Applicants with no coding experience will not be considered.)

	Chemistry <i>(continued)</i>		<ul style="list-style-type: none"> ● (Experimental and or theoretical) time resolved spectroscopy /laser spectroscopy and dynamics with molecular and / or materials science applications. <p>(iii) Inorganic chemistry with specific focus and demonstrated research in one or more of the following areas:</p> <ul style="list-style-type: none"> ● Functional inorganic materials ● Medicinal inorganic chemistry
4	Civil Engineering	<p>a) Candidate should have a Bachelor's degree in Civil Engineering for all areas, except (v).</p> <p>b) Outstanding candidates with demonstrated excellence in the research areas [(ii)&(iii)], with Bachelor's degree in other allied Engineering disciplines would also be considered</p>	<p>(i) Infrastructure and Construction Management.</p> <p>(ii) Solid Waste Management - Specifically focusing on Treatment technologies & Resource Recovery.</p> <p>(iii) Wastewater Treatment & Management.</p> <p>(iv) Water Resources Planning and Management -with specific emphasis on systems concepts, optimization and stochastic methods.</p> <p>(v) All areas of traffic engineering and transportation planning including Sustainable Transportation, Transportation Economics, Freight Transportation, Emerging Mobility Technologies (such as mobility-on-demand, electric vehicles, connected vehicles) and Traffic Safety</p> <p>(vi) Pavement Engineering and Management - Nonlinear Viscoelastic/Viscoplastic Analysis of Bituminous Materials, Application of Damage Mechanics and Fracture Mechanics to Bituminous Mixtures, Reliability-Based Design Optimization as applied to Pavement Engineering, Dynamic Analysis of Pavement Structures, Design of Bituminous and Concrete Pavements, Non-destructive testing of Pavements, Road Asset Management, and Pavement Construction Technology.</p> <p>Exceptional candidates in other areas of transportation engineering would also be considered.</p>

5	Computer Science & Engineering	Specific Qualification [#]	All areas
<p>#Computer Science & Engineering:</p> <ul style="list-style-type: none"> ● 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. <i>[This may be waived if the candidate was admitted to a direct Ph.D. program after the Bachelor's degree.]</i> ● Ph.D. Degree: Must be in Computer Science/ Computer Science and Engineering/ Computer Engineering. <p>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.</p>			
6	Electrical Engineering	At least one degree in Electrical Engineering	(i) Learning theory and non-convex optimization (ii) Integrated Photonics Devices for Quantum Applications
7	Engineering Design	<p>a) Bachelor's degree in Mechanical / Automobile / Engineering Design</p> <p>b) Bachelor's degree in Engineering Design/Electrical/Electronics/ /Mechanical/ Automobile.</p> <p>c) Bachelor's degree in Engineering Design/ Electrical /Electronics/Mechanical/ Biomedical Engineering</p> <p>d) Bachelor's degree in Engineering Design/ Mechanical/ Production / Design</p> <p>e) Bachelor's degree in Engineering Design/ Mechanical/ Production / Design/Computer science and Engineering</p>	<p>(i) Autonomous vehicle design (Demonstrated research experience during PhD in Sensor technology / Artificial intelligence / Image processing applied to autonomous vehicles design).</p> <p>(ii) Two-wheeler design (Demonstrated research experience during PhD, and at least 3 years experience after PhD in two-wheeler industry)</p> <p>(iii) Electric Vehicle Design (Demonstrated research experience during PhD in Battery Technology/ E-Drive System Design and Integration/ Alternate Vehicle Propulsion Energy Sources).</p> <p>(iv) Medical Device Design and development (including AI/ML applications in medical device design) with demonstrated research experience at doctoral level and translational research experience.</p> <p>(v) Industrial design (With demonstrated research experience in Human Factors / Form design / Aesthetics at doctoral level and translational research experience).</p> <p>(vi) Demonstrated research experience in developing novel algorithms and / or applying Artificial Intelligence and / or employing Virtual Reality / Augmented Reality / Mixed Reality in the field of Computational Design / Analysis / Manufacturing.</p>

	Engineering Design <i>(continued)</i>	<p>f) Bachelor's degree in Engineering Design/Electrical/ Electronics/Mechanical / Computer Science and Engineering</p> <ol style="list-style-type: none"> <i>Bachelor's degree should be 4-year professional degree in the branch as stated above.</i> <i>PhD in the relevant area of specialization. Post-PhD experience in translational research will be an added advantage.</i> 	(vii) Robotic system design for field and service applications (With demonstrated research experience at doctoral level and translational research experience in Soft robotics/ Human Robot Interactions/ Autonomous field robots)
8	Humanities & Social Sciences	PhD in related domain.	(i) Climate Policy (Adaptation and sustainability)
9	Mathematics	Both Master's degree and Ph.D. in Mathematics.	(i) Probability & Statistics (ii) Operator Theory
10	Metallurgical and Materials Engineering	Atleast one degree (Bachelor's/Master's degree) in Metallurgical or Materials Engineering.	(i) Artificial intelligence in Materials Science and Engineering.
11	Ocean Engineering	Ph.D relevant to Ocean Engineering / Naval architecture with excellent academic record with first degree in engineering in Naval Architecture/Civil/ Mechanical /Ocean.	(i) Naval architecture: Ship structures; Ship design; Marine Engineering; Recent techniques in ship design & construction; Ship machinery & systems; Autonomous and Green ships. (ii) Ocean Engineering: Offshore, Geotechnical Engineering for Offshore and Coastal Structures; Instrumentation in Ocean Engineering.
12	Physics	<p>Candidates should have a PhD in Physics or in any closely related disciplines.</p> <p>[If Ph.D is in a closely related discipline, at least one degree (Bachelors / Masters) should be in Physics]</p>	<p>(i) Soft Condensed Matter Theory (Biological and non-biological aspects of soft matter and expertise in both analytical and computational methods)</p> <p>(ii) Quantum materials (Experimental) (Expertise in the studies of quantum phenomena in contemporary materials (e.g., topological systems) at low temperatures, preferably using advanced techniques and large scale facilities)</p> <p>(iii) Quantum Device (Candidates with a strong background in nanofabrication leading to the exploration of novel quantum functionalities)</p>