

IIT Madras - Special Drive for SC/ST/OBC-NCL/EWS on Mission Mode**Specialization Areas****Advt.No.IITM/R/05/2021 Dt.03.11.2021**

Basic qualifications and experience for the post of **Assistant Professor (Grade-I / II)** is based on MoE norms and specified 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 outstanding academic record and outputs. Candidates must clearly demonstrate their capability in the specialization area applied for through publications in relevant reputed journals.

Department-wise specific qualification requirement (if any), and areas of specialization sought 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) Structural Dynamics (experimental background preferred) (v) Advanced Manufacturing of Aerospace Structures. (vi) Aerospace Propulsion. (vii) Avionics & sensors for aerospace applications (with hardware background)
<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 / Ph.D.) in Aerospace Engineering (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. 			
2	Applied Mechanics	a) At least one pre-Ph.D. Engineering degree (at the Bachelor's or Master's level) b) Post-doc research experience preferred	Areas related to solid mechanics, fluid mechanics, biological/bioinspired systems and/or bio-medical engineering with a strong interdisciplinary focus and fits into at least one of the following specializations: (i) Mechanics of: materials in engineering and/or biological systems and processes. (ii) Mechanics of complex systems; (iii) Energy/sustainability/climate-change related areas with a mechanics focus. (iv) Data science applied to mechanics. (v) Data science applied in medical-informatics. (vi) Diagnostic & therapeutic technologies; prosthetics & implants.

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3	Biotechnology	a) B.E. / B.Tech. in Chemical Engineering (preferably) / Biochemical Engineering / Biotechnology / equivalent	(i) Bioprocess engineering with demonstrated experimental expertise in at least one of the following specializations: a) Synthetic biology/Metabolic engineering for Green manufacturing of biofuels, platform chemicals, and specialty chemicals. b) Cell-line engineering / Bioprocess development / Downstream processing for recombinant therapeutics. (ii) Biomaterials engineering with a focus on at least one of the following specializations: a) Bioprocessing of materials for medical and non-medical applications. b) Data-driven or basic chemistry-inspired design and discovery of biomaterials. c) Immunomodulation via therapeutic vehicles, vaccines, or drugs.
		b) B.E./B.Tech. in Computer Science/Electrical/Chemical Engineering (or) Bachelor's degree in Maths/Statistics/ Physics with M.E./M.Tech/Ph.D. degree in Computer Science.	(iii) Large-scale genomic data analysis with demonstrated experience of developing algorithmic/AI/ML methods for next-generation sequence genomics / transcriptomics with applications to diseases and systems genetics
4	Chemical Engineering	At least one degree in Chemical Engineering.	All areas of Chemical Engineering
5	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) Inorganic (ii) Organic (iii) Physical (iv) Theoretical & Computational Chemistry.
6	Civil Engineering	Basic degree in Civil Engineering* *Exceptional candidates with basic degree in allied areas will be considered in the following areas: Construction Materials/ Infrastructure and Construction Management/ Environmental Engineering/ Transportation Engineering.	(i) Construction Materials (ii) Infrastructure and Construction Management (iii) Environmental Engineering (iv) Hydraulics and Water Resources Engineering (v) Geotechnical Engineering (vi) Structural Engineering (vii) Transportation Engineering

SNo	Department	Specific Qualification Requirement	Specialization Area
7	Computer Science & Engineering	Specific Qualification*	All areas of Computer Science and Engineering
<p>Specific Qualification*</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. [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. Ph.D. degree is required. <p>Applications of candidates with deviations to the educational qualification norms may be considered if they have an exceptionally strong record of publications in areas related to Computer Science and Engineering.</p>			
8	Electrical Engineering	<p>a) Candidates must have least one degree in Electrical Engineering</p> <p>or</p> <p>b) Candidates with degrees in Computer Science and Engineering / Physics and with strong research record in the areas of interest to the Electrical Engineering Department may also be considered.</p>	<p>(i) Wireless Communications, Networks, Signal Processing, Machine Learning</p> <p>(ii) Power Electronics & Motor Drives, Power Systems, Power Quality and High Voltage Engineering</p> <p>(iii) MEMS sensors and technology; GaN device technology; Technology for organic semiconductor devices</p> <p>(iv) Electronic System Design, Bio-Medical Instrumentation</p> <p>(v) Photonics and RF</p> <p>(vi) Analog, Mixed-signal, and RF IC design; Digital Systems Design and Architecture</p> <p>(vii) Learning approaches in Modelling and Control of Dynamical Systems, Computational Methods in Optimization, Cyber Physical Systems</p>
9	Engineering Design	a) Bachelor's degree in Mechanical / Automobile / Engineering Design	<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>

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	Engineering Design	b) Bachelor's degree in Engineering Design/Electrical/Electronics/ /Mechanical/ Automobile.	(iii) Electric Vehicle Design (Demonstrated research experience during PhD in Battery Technology/ E-Drive System Design and Integration/ Alternate Vehicle Propulsion Energy Sources).
		c) Bachelor's degree in Engineering Design/ Electrical /Electronics/Mechanical/ Biomedical Engg.	(iv) Medical Device Design and development (with demonstrated research experience at doctoral level and translational research experience)
		d) Bachelor's degree in Engineering Design/ Mechanical/ Production / Design	(v) Industrial design (With demonstrated research experience in Human Factors / Form design / Aesthetics at doctoral level and translational research experience)
		e) Bachelor's degree in Engineering Design/ Mechanical/ Production / Design/Computer science and Engineering	(vi) Computational Design (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><i>Bachelor's degree should be a 4-year professional degree.</i></p> <p><i>Post-PhD experience in translational research will be an added advantage</i></p>			
10	Humanities & Social Sciences	Ph.D. in related domain	(i) Applied economics (ii) Indian Writing in English (iii) Political theory (iv) Urban sociology (v) Analytical philosophy
11	Management Studies	a) Ph.D. in area of Information Systems	(i) Information Systems
		b) Ph.D. in area of Corporate Strategy	(ii) Corporate Strategy
12	Mathematics	a) Both Master's degree and Ph.D in Mathematics. b) At least 3 years of experience after Ph.D.	(i) Numerical Analysis (ii) Functional Analysis (iii) Representation Theory and Lie Algebras (iv) Number Theory (v) Operations Research (vi) Complex Analysis

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13	Mechanical Engineering	At least one degree (Bachelors / Masters / Ph.D.) in Mechanical Engineering	<ul style="list-style-type: none"> (i) Bio-microfluidics (ii) Refrigeration & Cryogenics (iii) Additive Manufacturing (iv) Open source software development in Mechanical Engineering (v) Experimental Methods in Acoustics & Dynamics (vi) Lubrication Engineering <ul style="list-style-type: none"> • Fluid film Bearings and Seals • Bio & Nano Lubrication (vii) Healthcare diagnostic systems (viii) Sustainable Energy Technologies (ix) Smart Manufacturing (x) Design Applications of Soft/ Bio-Materials/ Smart Materials/Metamaterials (xi) Dynamics & Control of Mechanical Systems
14	Metallurgical and Materials Engineering	Ph.D. relevant to the field of Metallurgical or Materials Engineering with at least one degree at the Bachelors or Masters level in Metallurgical or Materials Engineering	All areas of Metallurgical & Materials Engineering
15	Ocean Engineering	Ph.D. relevant to Ocean Engineering / Naval architecture with first degree in engineering in Naval Architecture/Civil/ Mechanical /Ocean.	<ul style="list-style-type: none"> (i) Naval architecture: Ship structures; Ship design & Ship building; Ship Motion/Maneuvering; Ship hydrodynamics; Recent techniques in ship design & construction; Ship machinery & systems; Autonomous and Green ships; Marine Engineering. (ii) Ocean Engineering: Coastal and Ocean Hydrodynamics; Offshore structure; Harbour & Coastal structures; Coastal Engineering; Offshore and Deepwater Engineering; Waterway and Port Engineering, Geotechnical Engineering for Offshore and coastal structures, Instrumentation in Ocean Engineering.
16	Physics	Ph.D. in Physics with at least 3 years postdoctoral experience	<ul style="list-style-type: none"> (i) Condensed matter theory (Computational/Machine learning) (ii) Gravitation and Cosmology (iii) Quantum optics (theory) (iv) Quantum optics/lasers (experiment) (v) High-energy physics phenomenology/lattice gauge theory (vi) Dynamical systems/ Nonlinear Dynamics. (vii) Experimental Atomic and molecular physics (viii) Energy materials