List of TA / TAP topics in the following domains available for Autumn 2025 PhD admission

Research Domains

- A: Physical & Mechanical Metallurgy;
- B: Process Metallurgy & Manufacturing;
- C: Structural Ceramics
- D: Electronic, Magnetic and 2D Materials;
- E: Energy Materials
- F: Polymers & Soft Matter;
- G: Corrosion & Coatings
- H: Modelling & Simulation

TA topics

Faculty	Desired Qualification	Title
A. S. Gandhi & N. Jaya Balila	M.Tech./M.E. in Metallurgy,	Mechanical behaviour of 'high
	Materials Science, Ceramics,	entropy' oxide ceramics
	B.Tech./B.E./M.Sc. in Metallurgy,	(Relevant to Domain A, C)
	Materials Science, Ceramics,	
A. S. Gandhi	Mechanical engineering	Or
agandhi@iitb.ac.in		
	M.Tech./M.E. in Metallurgy,	Spectroscopic condition
	Materials Science, Ceramics,	monitoring of high temperature
	B.Tech./B.E./M.Sc. in Metallurgy,	coatings in gas turbine engines
	Materials Science, Physics, Ceramics,	(Relevant to Domain A, C)
	Mechanical	
Abhinandan Gangopadhyay	B.E./B.Tech./M.E./M.Tech. in	Multimodal transmission electron
	Metallurgical Engineering, Materials	microscopy of defects and
	Engineering, Electrical Engineering,	interfaces in advanced materials
	Mechanical Engineering; M.Sc. or	(Relevant to Domain D, E)
	equivalent in Physics.	
		Or
	B.E./B.Tech./M.E./M.Tech. in	Development of next generation
Abhinandan Gangopadhyay	Metallurgical Engineering, Materials	III-nitride quantum emitters:
& Apurba Laha	Engineering, Electrical Engineering,	growth and characterization
<u>abhinandan.g@iitb.ac.in</u>	Mechanical Engineering; M.Sc. or	(Relevant to Domain D, E)
	equivalent in Physics.	
Ajay Singh Panwar	B.Tech/M.Tech. in Metallurgy/	Machine Learning and Molecular
	Materials/Chemical/Mechanical or	Simulations of Biopolymers
	MSc in Physics/ Chemistry (Physical)	(Relevant to Domain F, H)
Ajay Singh Panwar & Indradev	B.Tech/M.Tech. in	Or
Samajdar	Metallurgy/Materials/Chemical/	Multi-scale Simulation of Iron
<u>panwar@iitb.ac.in</u>	Mechanical	Oxide Reduction in Hydrogen
		Atmosphere
		(Relevant to Domain A, H)

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Amartya Mukhopadhyay <u>amartya_mukhopadhyay@iitb.ac.</u> <u>in</u>	Materials Science/Engineering and related areas (including metallurgy), Electrochemistry, Physics, Chemistry, Ceramics	Functional electrode or solid electrolyte materials for Li-ion and Na-ion batteries (electrochemical energy storage; from materials to electrochemistry to cell development) (Relevant to Domain E)
Amrita Bhattacharya <u>b.amrita10@gmail.com</u>	Physics, Materials Science, Electronics	Computational exploration of spintronics application of correlated oxides (Relevant to Domain D) Or Computational exploration of Rashba Spintronics in Oxides (Relevant to Domain D)
Anirban Patra anirbanpatra@iitb.ac.in	Mechanical/Aerospace/Materials	Modeling irradiation-induced deformation in zirconium alloys for nuclear applications (Relevant to Domain H)
Aparna Singh aparna_s@iitb.ac.in	BTech/MTech Materials Science, Metallurgical Engineering, Mechanical Engineering BTech/MTech materials Science, metallurgical engineering, Mechanical Engineering	Development of carbon fiber composites with nano-fillers for space applications (Relevant to Domain A, F) Or Development of nano-structured steels for space and defence applications (Relevant to Domain A)
Arup R. Bhattacharyya arupranjan@iitb.ac.in	 M.Tech. in Polymer Science & Engineering, Materials Science & Engineering, Chemical Engineering; M.Sc. in Physics or Chemistry M.Tech. in Polymer Science & Engineering, Materials Science & Engineering, Chemical Engineering; M.Sc. in Physics or Chemistry 	2D Nano-materials based poly(vinylidene fluoride) nano composites for piezoelectric applications (Relevant to Domain F) Or Poly (vinyl alcohol) nanocomposite hydrogels for triboelectric nanogenerator applications (Relevant to Domain F)
Avradeep@iitb.ac.in	M.Sc in Physics, MTech in Materials Science, M.Tech. in Electronics or Electrical Engineering	Josephson effect with artificial non-centrosymmetric superconductors (Relevant to Domain D) Or Fabrication of high frequency Josephson memory devices (Relevant to Domain D)
Abhijeet L. Sangle & Professor Ashwin A. Seshia alsangle@iitb.ac.in	All science and engineering streams	Flexible wearable thermoelectric devices (Relevant to Domain D)

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Deepoo Kumar & Prof M P Gururajan <u>deepook@iitb.ac.in</u>	Metallurgical Engineering, Mechanical Engineering or Chemical Engineering	Role of argon bubbles on inclusion removal during continuous casting (Relevant to Domain B)
Dipti Gupta diptig@iitb.ac.in	BTech or M.Tech. in Materials/Metallurgy/Chemical/Elect rical/Mechanical or MSc in Physics/Chemistry	Development of flexible semiconductor devices (Relevant to Domain D)
	BTech or M.Tech. in Materials/Metallurgy/Chemical/Elect rical/Mechanical or MSc in Physics/Chemistry	Or Development of flexible and printed sensors (Relevant to Domain D)
Jayasree Biswas biswasj@iitb.ac.in	B.E/ B.Tech./ M.E./ M.Tech. in Metallurgy, Mechanical, Chemical Engineering	Kinetic studies in green steelmaking (Relevant to Domain B) Or Recycling of Urban Ores (Relevant to Domain B)
M P Gururajan guru.mp@iitb.ac.in	Physics, Materials Science, Metallurgy, Mechanical Engineering, and, Chemical Engineering	Development of Machine Learned Interatomic Potentials for Molecular Simulations (Relevant to Domain D, H)
Manish M Pande manish.pande@iitb.ac.in	B.Tech / BE/ M.Tech. Metallurgy or Chemical	Application of slag engineering to steel refining processes (Relevant to Domain B) Or Thermodynamics of steel refining reactions (Relevant to Domain B)
Mithun Chowdhury mithunc@iitb.ac.in	MSc Chemistry/Physics, BTech/MTech Chemical Engineering, Materials Science, Polymer Science	Vitrimeric polymer thin film dynamics (Relevant to Domain F) Or
	MSc Chemistry/Physics, BTech/MTech Chemical Engineering, Materials Science, Polymer Science	Entropy and information evolution in non-equilibrated polymers (Relevant to Domain F)
Smrutiranjan Parida paridasm@iitb.ac.in	MTech in metallurgy/materials science/ chemical engineering/nanotechnology, MSc or MS chemistry/physics/electrochemistry	Corrosion problem in hydrogen production by electrolysis (Relevant to Domain G) Or Cool roof coatings
	science/ Chemical Engineering/Nanotechnology/ Polymer, MSc or MS Chemistry/ Polymer/ Physics	(Relevant to Domain G)

Shobha Shukla	Materials, Polymers, Chemistry or	Metasurfaces to enhance light	
<u>ssnukla@litb.ac.in</u>	any	photodevices	
	Materials, Polymers, Chemistry or	Or	
	any	Nanocomposite membranes development for water	
		purification	
Sumit Saxena sumit.saxena@iitb.ac.in	MSc in Physics or Chemistry and BTech/MTech or equivalent degree in Energy Science, Nanotechnology,	(Relevant to D, F) Development of Graphene based materials as electrodes for supercapacitors	
	Chemical Engineering, Materials Science	(Relevant to Domain C, E) Or	
		Development of MXenes based materials for energy storage solutions (Relevant to Domain E)	
Somnath Basu	B.Tech./B.E./equivalent in Metallurgical Engg. / Materials	Structural characteristics of environment-friendly oxide-	
somnathbasu@iitb.ac.in	Science / Ceramics	fluoride fluxes for welding applications	
	M.Tech./M.E./equivalent in	(Relevant to Domain B)	
	Science / Ceramics	Valorisation of recycled solid	
	M.Sc. in Chemistry (focus on	wastes from metal production for water purification applications (Relevant to Domain B)	
TRS Prasanna and Amrita	M.Sc. Physics / Materials Science	Role of electron-phonon	
Bhattacharya prasanna@iitb.ac.in	M.Tech / B.Tech any	interactions on structural and electronic properties of semiconductors	
		(Relevant to Domain D)	
Titas Dasgupta titas dasgupta@iith ac in	Materials Science, Ceramics, Metallurgy, Chemistry, Physics	Synthesis and Study of Thermoelectric properties of	
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		(Relevant to Domain D, E) Or	
		Study and development of	
		segmented thermoelectric devices for power generation	
		(Relevant to Domain D, E)	
Triratna P Muneshwar	M. Sc. / M.Tech. in Physics, Electrical	Electromigration and strategies to	
<u>indiesnwar@ntb.ac.m</u>	of Electronics, Materials science	integrated circuits (Relevant to Domain D)	
		OR Charge transport in the	
		recombination layer in Silicon-	
		Perovskite tandem solar cells (Relevant to Domain D)	

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Vijayshankar Dandapani & Prof. MP Gururajan, Prof. NJ Balila <u>v.dandapani@iitb.ac.in</u>	Materials Science, Metallurgy, Mechanical, Physics, Chemistry	Quantifying impact of hydrogen permeation through pipeline steel weldments with computational phase field modelling for safe and reliable blended hydrogen gas transport (Relevant to Domain G)

TAP topics

Faculty	Title	Desired Qualification	
TAP-1 TAP-2	Effect of microstructure on the mechanical properties of yttria stabilized zirconia thermal barrier coatings (Pratt and Whitney PhD Fellowship) (Relevant to Domain A, C)	M.Tech./M.E. in Metallurgy, materials science, ceramics. B.Tech./B.E./M.Sc. in Metallurgy, Materials Science, Ceramics, Mechanical Engineering M.Tech./M.E. in Metallurgy, materials science, ceramics.	A. S. Gandhi & N. Jaya Balila <u>agandhi@iitb.ac.in</u> A. S. Gandhi <u>agandhi@iitb.ac.in</u>
	thermal barrier applications (Relevant to Domain A, C)	B.Tech./B.E./M.Sc. in Metallurgy, Materials Science, Ceramics, Mechanical Engineering	
TAP-3	Self-assembled vertically aligned nanocomposites for memory and neuromorphic computing applications (Relevant to Domain D)	All Engineering/Science streams	Abhijeet L. Sangle & Professor Debanjan Bhowmik <u>alsangle@iitb.ac.in</u>
TAP-4	Design and Development of Safe Sustainable and Cost-Effective Na-ion batteries based on 'Aqueous Processed' Electrodes (Relevant to Domain E)	Materials Science/Engineering and related areas (including metallurgy), Electrochemistry, Chemistry, Physics, Ceramics	Amartya Mukhopadhyay amartya mukhopadhyay @iitb.ac.in
TAP-5	Developing of advanced high strength steels for automotive applications (Relevant to Domain A)	BTech/MTech Materials Science, Metallurgical Engineering, Mechanical Engineering	Aparna Singh aparna_s@iitb.ac.in
TAP-6	Impact of oxygen incorporation on optoelectronic properties on transition metal dichalcogenides (Relevant to Domain D)	MSc Physics, BTech/MTech Materials Science, BTech/MTech Metallurgy. Other specialization may also be considered	Tanushree Choudhury <u>tanuhc@iitb.ac.in</u>
TAP-7	AlScN-based piezoelectric films for MEMS applications (Relevant to Domain D)	Any Science/Engineering Background	Abhijeet L. Sangle & Ashwin A. Seshia <u>alsangle@iitb.ac.in</u>
TAP-8	Wafer-scale Emitter and Detector Arrays for Multi-wavelength Room Temperature Photonic Quantum Technologies (Relevant to Domain D)	From Physics, Computation, Materials Science	Amrita Bhattacharya <u>b_amrita@iitb.ac.in</u>

NOTE:

Please note that the topics (i.e., other than the TAP topics), as in the department website https://www.iitb.ac.in/mems/en/phd-admission), which do not have any code, are TA topics available for this round of admission. You do not have to give any preference for TA topics in the preference(s) sheet (a Google link, to be circulated) for the research topic/domain, but for TAP projects available.

We do not advertise separate topics for candidates who applied under FA/SW/EX/CT/PS categories, while they will be interviewed under their chosen research domain. Upon successful interview, in case the candidate is offered admission in any of those categories, they can decide research topic and guide (faculty) after mutual discussion and interests. In case if you have already had a discussion with any of the faculty members in MEMS department, you are welcome to indicate the name of the faculty while filling out the 'preference Google form'.

Shortlisted candidates will get an email containing the link to the 'preference Google form' to give a choice of domain for the interview, and TAP topics available for this admission round. The Google form will be sent to the email ID used in the original application form.

While filling out the Google form,

(a) Interested TA/RA/SF candidates can choose a maximum of two TAP topic choices(s) and those may preferably be relevant to the chosen research domain. Make sure that your technical background, expertise and degree(s) meet the eligibility criteria set by PI of the TAP and have relevance to the topic.

(b) Because of differences in the admission process for each category, it is not possible to entertain any request for changing the category (for example, TA to TAP, TAP to TA, FA/SW/EX/CT to TA/TAP) at any stage after getting admitted. Suggested to read the guidelines mentioned in the Institute information brochure (https://acad.iitb.ac.in/files/Ph.D._Brochure_2025_26.pdf). Since there are no RA seats in this round of admissions, the candidates who applied for RA category will be considered under TA category.