Teaching Learning Centre

Indian Institute of Technology Madras

Chennai - 600 036, India

Dear Colleague,

Greetings from the TLC, IIT Madras!

It is with great pleasure that we announce the first **in-person** training program for undergraduate and postgraduate Mathematics teachers in the country on the following aspects: Interdisciplinary Approach, Skill Development, Research and Innovation, Global Competitiveness, and Experiential Learning.

These points highlight the key aspects of NEP 2020 to promote STEM education in India, with the goal of transforming our country into a global knowledge superpower. This program is conceived under the auspices of the Malaviya Mission Teacher Training Programme (MMTTP), and coordination at IIT Madras is managed by the Teaching Learning Centre (TLC).

The primary outcome of the training program is to upskill the teachers to induce a collaborative learning culture among the student community for continuous improvement and innovation in learning Mathematics. Further, the program is envisioned to create a research culture among college teachers that their students can imbibe. We also expect that this will lead to increased enrolment in mathematics-related courses in Indian Universities through teacher training on student engagement, inclusive education, and vocational training.

The program will be offered two times a year. This first program is planned from July 19-27, 2025.

Venue: TLC Hall, Central Library, IIT Madras

Kindly identify two to five teachers from your institute who are interested in registering for the first program. Kindly request them to register in the Malaviya Mission Portal for the training program in Mathematics (Malaviya Mission Teacher Training Programme (ugc.ac.in)

If you have any queries regarding this new initiative, please feel free to reach us via the contact email below:

tlc@smail.iitm.ac.in

With best regards

Edamana Prasad

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More details about the program:

Syllabus

Real Analysis (RA)

Sequences and Series of Real Numbers: convergence of sequences, bounded and monotone sequences, Cauchy sequences, Bolzano-Weierstrass theorem, absolute convergence, tests of convergence for series – comparison test, ratio test, root test; Power series (of one real variable), radius and interval of convergence, term-wise differentiation and integration of power series.

Functions of One Real Variable (DC):

Limit, continuity, intermediate value property, differentiation, Rolle's Theorem, mean value theorem, L'Hospital rule, Taylor's theorem, Taylor's series, maxima and minima, Riemann integration (definite integrals and their properties), fundamental theorem of calculus.

Multivariable Calculus (MC):

Functions of Two or Three Real Variables: limit, continuity, partial derivatives, total derivative, maxima and minima.

Integral Calculus (IC):

Double and triple integrals, change of order of integration, calculating surface areas and volumes using double integrals, calculating volumes using triple integrals.

Differential Equations: (DE):

Bernoulli's equation, exact differential equations, integrating factors, orthogonal trajectories, homogeneous differential equations, method of separation of variables, linear differential equations of second order with constant coefficients, method of variation of parameters, Cauchy-Euler
equation.

Finite Dimensional Vector Spaces (VS)*:*

Linear independence of vectors, basis, dimension, linear transformations, matrix representation, range space, null space, rank-nullity theorem.

Matrices (M)*:*

Systems of linear equations, rank, nullity, rank-nullity theorem, inverse, determinant, eigenvalues, eigenvectors.

Groups (G) :

Cyclic groups, abelian groups, non-abelian groups, permutation groups, normal subgroups, quotient groups, Lagrange's theorem for finite groups, group homomorphisms

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Every day of the training programme for the duration of 9 days will have 4 classes with emphasis on problem solving. Each class will be 1.5 hours long.

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