

About NIT Meghalaya

The National Institute of Technology (NIT) Meghalaya is one among the 31 NITs in India established in 2010 under the NIT Act 2007 (Amended 2012) of the Parliament of India as Institutes of National Importance with full funding support from the Ministry of Education, Government of India. The Institute is currently operating from its temporary campus in Shillong. It offers B. Tech, M. Tech, M.Sc. and PhD programmes. The Institute has been ranked in all editions of the National Institute Ranking Framework (NIRF) and was ranked 59 in the Engineering category, NIRF 2021. For more details, visit <http://nitm.ac.in>



About the Department of Mathematics

The Department of Mathematics started functioning in June 2012. Currently the department offers 2-year M.Sc. and PhD programmes. In addition, the department plays an important role as a supporting department to various B.Tech and M.Tech programmes of the institute. The main objective of the department is to attract students of science and engineering, and to provide for them academically coherent programmes, with courses that range from the fundamental to the advanced. Also to provide students with friendly pastoral and academic support which will help them develop their capabilities in an environment where both independent study and interaction with staff and fellow students are encouraged.

Patron

Prof. (Dr.) Bibhuti Bhusan Biswal
Director, NIT Meghalaya, India

Coordinator

Dr. Manideepa Saha
Assistant Professor, NIT Meghalaya
Email: manideepa.saha@nitm.ac.in
Mobile: +91-9485177032

Co-coordinator

Dr. Saikat Mukherjee
Associate Professor, NIT Meghalaya
Email: saikat.mukherjee@nitm.ac.in
Mobile: +91-9485177034

Organizing Committee

Dr. Bidyasagar Kumbhakar, Asst. Prof., MA, NITM
Dr. Tikaram Subedi, Asst. Prof., MA, NITM
Dr. Adarsha Kumar Jena, Asst. Prof., MA, NITM
Dr. Timir Karmakar, Asst. Prof., MA, NITM

Program Monitoring Committee

Dr. Gitish Kishor Dutta, Dean (R&C), NITM
Col. B. Venkat, Director (Faculty Development Cell), AICTE
Dr. Manideepa Saha, Asst. Prof, MA, NITM
Dr. Saikat Mukherjee, Assoc. Prof.(MA), NITM
Dr. Rabindra Narayan Mahapatra, HoD (ME), NITM
Dr. Paonam Sudeep Mangang, HoD (HS), NITM



**AICTE Sponsored Five Days Short
Term Training Programme (STTP) for
Teachers**

on

**Numerical Linear Algebra &
Optimization Techniques in
Engineering**

**March 15 - March 19, 2022
(Online Mode)**

organized by



**Department of Mathematics
National Institute of Technology
Meghalaya
Shillong-793003, Meghalaya, India
Web: <http://nitm.ac.in/>**

About the Programme

Linear Algebra and optimization are at the core of most scientific computing applications. Methods of numerical linear algebra are concerned with the theory and practical aspects of computing solutions of mathematical problems in engineering such as image and signal processing, telecommunication, data mining, computational finance and bioinformatics. The proposed STTP introduces modern tools of numerical linear algebra based on applied analysis. Solving large linear systems of equations can be considered as the most time-consuming aspect of solving a problem computationally. Many real world problems, like data fitting problems, classical Computer Vision problems, involved linear systems with no solutions, mainly due to too many equations. Such problems can be tackled by solving a linear least-square problem (LSP)- minimizing the sum of the squares of the residual. An LSP can be solved by finding the eigenvector corresponding to the smallest, or zero, eigenvalue of the coefficient matrix. The STTP is aimed to provide appropriate computational methods together with their stability analysis, for solving linear systems, LSP, and for finding eigenvalues and eigenvectors of the coefficient matrix.

The application of optimization in engineering has a very long history, which not only helps engineers in their design and analysis of systems, but also leads to significant advances and new discoveries in optimization theory and techniques. For example, numerous engineering design problems need to deal with noisy data, manufacturing error or uncertainty of the environment during the design process. Such engineering optimization problems, like the antenna synthesis

problem, lead to the birth of robust optimization, a new emerging research area in the context of convex optimization. Further, the application of optimization in chemical engineering has resulted in several powerful optimization packages in that field and these packages have also been proved to be useful tools for solving general optimization problems. Variety of optimization topics, which includes linear and non-linear optimization problem, in a manner that integrates theory, algorithms, modeling, and computer implementation are presented through this STTP.

Each topic of the proposed STTP is presented as algorithmic ideas and through a foundation based on mostly applied analysis. Experienced researchers in these fields will explain the necessary background for taking up different types of problems encountered in Engineering and for further research in these fields.

Topics to be discussed

1. Basics of matrix theory and computation
2. System of linear equations: direct and iterative methods
3. Conditioning of problems and stability of numerical algorithms
4. Linear least square problems and its solution
5. Methods of calculating eigenvalues and eigenvectors
6. Linear programming: Simplex method & Duality
7. Nonlinear programming
8. Convex Optimization and its Applications
9. Numerical optimization techniques
10. Optimization techniques in engineering

Resource Persons

Sessions will be conducted by resource persons from reputed institutions like IIT, NIT and Central University.

Eligibility

The faculty members of the AICTE approved institutions, research scholars, and Industry Persons can apply.

Selection will be done based on First-Come-First Serve basis. An evaluation test will be conducted at the end of program and certificates will be issued only to those participants attending all sessions of the STTP and who qualifies the test with 60% marks.

Important Dates

Last date of Registration	10.03.2022
Intimation of selection	11.03.2022
Confirmation of participation	12.03.2022

Registration Details

- No registration fee will be charged from the participants.
- Register Form link: <https://forms.gle/DNd5nDkYmuw2dnVg7>
- Due to limited seats, applications will be considered on First Come First Serve basis.