

Indian Institute of Technology Delhi
TEQIP-III Sponsored Short-Term Course

**Fracture Mechanics:
Linear Elasticity & FEM**



**IIT Delhi, Hauz Khas, New Delhi
Sep 30 – Oct 04, 2019**

This short-term (30 hour) course covers the basic theory of fracture mechanics built over linear elasticity and solution methods using Finite Element Method (FEM).

Established in 1961, Indian Institute of Technology Delhi is one of the premier educational institutions in the country. Situated in the National Capital, IIT Delhi has been instrumental in providing solutions to technological and societal problems through innovative academic and research activities. Recently, IIT Delhi has been awarded the status of “Institution of Eminence” by the Government of India.

Learning objectives

1. Theoretical concepts of Linear Elastic Fracture Mechanics (LEFM)
2. Use of Finite Element Method in Fracture Mechanics problems (ABAQUS)

On successful completion of the course, the participants will be able to

1. Appreciate the importance of Fracture Mechanics in engineering applications
2. Critically link the concepts of linear elasticity into the theories of fracture mechanics
3. Understand the application of FEM in fracture mechanics – both theoretically and using ABAQUS
4. Potentially teach a course in Fracture Mechanics at their place of work – academia/industry

Course contents

1. Linear Elasticity: Fundamentals of stress, strain, strain energy, plane stress and strain, formulating elasticity problem with boundary conditions
2. Finite Element Method: Fundamentals, quarter point element, role in fracture mechanics
3. Fracture Mechanics: Linear Elastic Fracture Mechanics, Fracture criteria (G, K, J, CTOD), mixed-mode fracture, elasto-plastic fracture mechanics, Fatigue crack growth, case studies

Practical components

The course has ample practical sessions for simulations and includes a lab tour to demonstrate fracture testing facilities.

Target Audience

The course is designed for faculty members and research scholars at TEQIP-III institutes.

Participants (students, faculty members and industry employees) from non TEQIP-III institutions are also welcome to register by paying fees. Accommodation and travel costs for non-TEQIP-III participants will have to be borne themselves.

Course Coordinator

Gaurav Singh
Assistant Professor
Department of Applied Mechanics
Indian Institute of Technology Delhi
Hauz Khas, New Delhi – 110016

Contact

For any query (registration, course content, travel or accommodation), please send an email to fracture_iitdelhi@outlook.com

The following faculty members will deliver lectures during this course:

Prof. Gaurav Singh works as an Assistant Professor at the Department of Applied Mechanics at IIT Delhi. He completed his B.E. in Mechanical Engineering from BITS Pilani (Goa Campus) and Ph.D. in Fracture Mechanics from Imperial College London. He has worked at University of California (Los Angeles) and BITS Pilani (Goa Campus) before his current position. His area of research is Fracture Mechanics and teaches courses in Elasticity and Plasticity at IIT Delhi.

Prof. Puneet Mahajan did his B.E. and M.E. from Delhi College of Engineering and Ph.D. from the Montana State University. Since 1992 he has been a faculty member at IIT Delhi. Puneet Mahajan's field of interest is Solid Mechanics and he does research in Mechanics of Composites, Motorcycle helmet design, Snow Mechanics and Applications of Finite Element Method. He holds a Chair Professorship in Transportation Research and Injury Prevention.

Prof. Rajesh Prasad did his B.Tech. from B.H.U., M.E. from I.I.Sc. and Ph.D. from the University of Cambridge, all in Metallurgy. Since 1995 he has been a faculty member at IIT Delhi where he received the Teaching Excellence Award in 2012. He was awarded the Distinguished Alumnus Award of the Department of Metallurgical Engineering, B.H.U in 2013. Prof. Prasad's fields of interest is physical and mechanical metallurgy. He offers a web-based course on Introduction to Materials Science and Engineering on NPTEL.

Deadlines

1. **Aug 30 2019:** Receipt of Registration Form through email.
2. **Sep 02 2019:** Intimation to confirmed participants.
3. **Sep 08 2019:** Last date for confirmed participants to deposit refundable security amount (Rs. 2000).

Fees

Participants from / Fee (Rs.)	Registration	Accommodation	Travel
TEQIP-III institutes	0	0*	0**
Non-TEQIP-III institutes	Student : 05,000	borne by participant	
	Faculty : 10,000		
	Industry : 30,000		

Registration fee includes lunch on all days. GST extra.

***Accommodation**

Boarding and lodging will be arranged for all selected participants. For faculty, the arrangement will be on a twin-sharing basis in guest house/hotel. For research scholars, the arrangement will be on sharing basis in hostels.

****Travel**

Third AC train and local travel fare will be provided to participants from TEQIP-III institutes only after producing the tickets/bills with the provided TA form.

Registration Form

Fracture Mechanics: Linear Elasticity & FEM
(Sep 30 – Oct 04, 2019)

Please fill the following using block letters

Name of applicant :

Designation :

Department :

Institute / Organization :

Address :

Date of birth (DD/MM/YYYY) :

E-mail ID :

Mobile number :

Do you need accommodation : Yes / No

Signature of applicant with date

Dr./Prof./Ms./Mr.

is an employee/ a research scholar at my organisation/ institute and is permitted to attend the course on “Fracture Mechanics: Linear Elasticity & FEM” at IIT Delhi during Sep 30 – Oct 04, 2019.

Signature of head with date and seal

(Please send the signed/sealed copy of this page as a PDF attachment to fracture_iitdelhi@outlook.com)