

Comprehensive Course on Tyre Technology



Duration: September 16th to 18th, 2024

On Campus Venue : Mysuru, Karnataka, INDIA



INDIAN RUBBER INSTITUTE

About Indian Rubber Institute

Indian Rubber Institute (IRI), is a professional body of rubber technologists, engineers, scientists, academicians and other professionals and organizations associated with the rubber and allied industry in India. A non-profit organization of 65 years standing, IRI was constituted as a national body and has since been continuing its educational and training activities through their eight branches spread across India in Chennai, Delhi, Gujarat, Karnataka, Kerala, Kolkata, Mumbai, and Rajasthan..

In order to substantially enhance the academic activity and to support rubber Industry, IRI has set-up Dr. D Banerjee Centre of Excellence in Mysuru, Karnataka in 10,000 sft area. The center is equipped with all types of facilities for training, education and testing of rubber products.

The Course

This comprehensive course is designed for the benefit of different experience and skill set required in the tyre Industry.

The course will provide an understanding of tyre technology that includes polymers, rubber, compounding, tyre design, Modelling, manufacturing and Tyre testing.

This course will provide comprehensive learning on the basics and advance level of understanding about the technology that goes behind making a superior tyre. The course will cover advance tyre technology as well which are vital for superior performance of tyres such as rubber fracture & friction, footprint, RRC, Force & Moment, NVH, Vehicle Dynamics, Tyre failure mechanism etc. along with latest in testing methods adopted and accepted globally.

For Whom

- Tyre Design Engineers
 - Process Technologists
 - R & D Engineers & Scientists
 - Compound Developers
 - Validation & Test Engineers
 - Rubber & Polymer Technology Students
 - Vehicle Test Engineers
 - Vehicle Designers
 - Tyre Raw Material technologists
 - Vehicle Simulation Engineers
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Course Content ...

Session 1 Introduction to Rubber & Material

Rubber, a versatile material
Natural Rubber
Synthetic Rubber- BR, SBR, IIR, XIIR, EPDM
Fillers. Additives, processing aids

Session 2 Reinforcing Material

Organic Tyre Cords – Nylon, Polyester, Rayon, Aramid... properties, application & selection of cord.
Inorganic Tyre Cord - Steel & Bead Wire

Session 3 Overview of Tyre Technology

Tyre – a high-tech composite
Brief Introduction of tyre technology – Bias vs Radial, Tube type vs Tubeless
Present and future technology in tyres

Session 4 Rubber Compounding Technology

Radial Compound Design
Commercial and Passenger Car tyres
Bias Compound Design
Commercial, Off Highway Tyre, Agri Tyres, Industrial, 2/3-Wheeler

Session 5 Rubber—Friction, Fraction & Wear

Rubber Friction Mechanism and its influence on tyre performance (dry & wet braking).
Rubber fracture mechanism and its influence on tyre performance.
Wear mechanism and influencing factors.

Session 6 Compound Mixing Technology

Principal of mixing technology (temp, heat, energy)
Importance of good dispersion and blending
Advance Mixing Technology

Session 7 Tyre Design—Basic ... Cavity & Pattern Design

Cavity Dimension Calculations
Natural equilibrium Theory & Improvisation, Cord Path
pattern design, Patter Design for noise and Hydroplaning
Cured tyre layout design, Bead and Carcass Strength

Continued...

Session 8 Tyre Design—Advance... RRC , FM & Footprint

Footprint mechanics – static, rolling, cambered and slip angle condition
Fundamentals of Rolling resistance, Factors influencing rolling resistance , vehicle fuel economy
Fundamentals of tyre Force & Moment—Lateral & Longitudinal dynamics, Vehicle handling performance

Session 9 Tyre Modelling—Basic Computational Method

Introduction to FEM in tyre
Use of CAE in tyre design... pneumatic & non pneumatic tyres
Tyre material characterisation for hyperelastic and viscoelastic properties.
Modelling for pneumatic tyre components.
Analysis for Stiffness, footprint, stress- strain Properties, Rolling Resistance & Temp distribution

Session 10 Tyre Modelling—Advance... Tyre & Vehicle Model Simulation

Overview of Fiala, Magic Formula and F-Tire Model, Comparison of the above models w.r.t advantages and disadvantages.
Magic Formula – Experiment and parameter extraction
Vehicle Dynamics Simulation using Magic Formula coefficients and vehicle model.

Session 11 & 12 Tyre Manufacturing Technology

Upstream Equipment
Extruder, Calendar, Dipping,
Downstream Equipment
Tyre Building—Bias & Radia, Curing
Quality Control Parameter for outgoing product quality

Session 13 & 14 Tyre Testing ... Indoor and Outdoor

Test Machines for Tyre Characteristics
Endurance, Plunger, RRC, F&M, Footprint, Deflection & Stiffness test
Global Tyre Standard, REACH/NHATSA/ECE
Tyre testing on tracks for
Handling, Braking, Acceleration, Noise , Comfort

Session 15 Tyre Failure ... Mechanics of Tyre Failure

Mechanics of tyre failure
Major failure in tyres
Tyre Wear

Speakers

Dr. R Mukhopadhyay, (51Years), PhD , Rubber Science and Tyre Technology



Dr. R. Mukhopadhyay is a well known speaker in international rubber and tyre industry. With over 50 years of experience in Education, Training and Research in Rubber Science and Tyre Technology, he is credited with more than 200 research and Technical Papers in National & International journals and seven Patents from his research work. He is the Chairman of Indian Rubber Institute (IRI) and President of IRMRI., a Fellow Member of Indian National Academy of Engineers (FNAE), The Institution of Engineers India (FIE), American Chemical Society-Rubber Division, Member Board of Directors of Rubber, Chemical & Petrochemical Skill Development Council (RCPSDC), NSDC, Govt. of India.

Vitesh Kumar Giri (28 Years), B Tech, Ex PGP

Tyre Design



Vitesh Kumar Giri is a seasoned tyre professional having 27 years of experience in designing and developing tyres. He has a Bachelor degree in Mechanical Engineering from NIT JSR, a Ex PG Diploma in Management from IIM Indore . Vitesh focuses his practice on Tyre Design and have designed and developed hundreds of tyres across the segment bias, radial. He is principal consultant with CRyT Innovation providing consultancy to tyre companies across the globe.

Dr. Samar Bandopadhyay, (33 Years), M. Tech PhD Rubber & Material Science



Dr. Samar Bandopadhyay is a well experienced rubber technologist in rubber & tyre compounding, material selection and testing. He is Ph.D. in plastic & Rubber Technology. His experience expands across the rubber industries including tyre and other related products. He is visiting professor in various universities and is permanent faculty member of DIRI course conducted by IRI. He is fellow member of Institute of Engineers, Lead Assessors at NABL. He has 60 Technical papers and various book chapters to his credit.

Dr. Prasenjit Ghosh, (25 Years), M. Tech, PhD

Rubber Technologist



Dr. Prasenjit Ghosh, has rich experience in the field of Finite Element Analysis of Automotive Products and rubber technology. Dr. Ghosh holds MTech. degree from IIT Kharagpur and Ph.D. degree from IIT Madras. He is seasoned speaker in national / international conferences. He is a Fellow Member (FIE) of Institution of Engineers (India), Member of Society of Automotive Engineers (SAE), India and Member of Indian Rubber Institute (MIRI). He has about 35 research publications in International Journals, Conferences and book chapter to his credit.

Amitabha Saha, (20 Years), B.Tech, NIT Finite Element Modelling



Amitabha Saha, was instrumental in creating India's first tyre simulation setup. He has more than two decades of experience using simulation technology, and has trained generations of simulation engineers. He is responsible for method developments like prediction of wear pattern, inclusion of tread pattern in simulation, curing simulation and the implementation of material models. He has more than 15 projects and more than 10 publications. His hobbies include maintaining a digital library.

Speakers

Pundarik Mahata (17 Years), ME , Vehicle Dynamics



Pundarik Mahata is a seasoned professional with 17+ years of rich experience in the design field of various Automotive Component. He has experience with leading automobile maker in the field of design, development and failure analysis on different driveline components. His work domain includes automobile system design, vehicle dynamics, studying contribution of components on vehicle dynamics, tyre technology, tyre mechanics. He has good knowhow on the simulation of components and MBD.

Dr Ali has an abundant knowledge and skill in the field of Mixing Technology. He is currently looking after Asian countries at HF mixing group, Germany based out of Bengaluru, INDIA. He is a PhD in Polymer/Rubber Processing and Characterizations Technique. He is a well-known speaker in the field of Mixing Technology and participated several National International Seminars and Conferences. He has also conducted several workshops in India and abroad. Faculty for Universities including

Dr. M N Aji (29 Years), PhD Mixing Technology



Dr, Manish Jaiswal (24 Years), Director, Natrax



Dr. Manish Jaiswal holds over two and half decades of experience in various mobility domains,. He comes with a strong experience in Vehicle and Automotive Engineering - holds a PhD and Master's degree in Automotive subjects and has worked in all three layers of Automotive – OEMs, Component Manufactures and Tyres.

He is serving as Director Natrax and prior to that has worked in R&D units of National and Multi-National organisations. .

Unnikrishnan PK (34Years), BE Ind. Engg.

Indoor Testing



Unnikrishnan P K is an ardent tyre technologist with a passion for revolutionizing the characterization of tyre properties. With over 24 years of experience in tyre technology at Apollo Tyres, PKU has honed his skills to become a highly competitive and dedicated professional, who loves his job. His extensive plant management, marketing, and quality control, has given him a unique brch Center at Global R&D Center-Asia, a mission he has been dedicated to for the last 15 years.

B Balachandran (30 Years), BE Tech Reinforcing Technology



Balachandran B, is having versatile experience in the fields of tyre and steel cord, with a career spanning over 30 years. His core expertise is in the field of reinforcing materials and process. He is currently heading Technology, R&D and Quality in Ralson (India) Ltd. Before joining Ralson he was working with Apollo tyres in R&D as Head of Process Technology Development. He has also worked with NV Bekaert SA as Key global account Manager

Rajesh Manker (28Years), BE Chem.

Manufacturing Technology

Rajesh, Carries over 28 years' experience in areas of manufacturing process technology, Tyre design & Industrialization with leading global and Indian tyre manufacturers. He has worked on development of autonomous tools to facilitate HEP and improve OEE. Rajesh, in the roles of Head -Plant Technology and Leader – Tyres and Rubbers has managed some of large-scale transformative and new technology projects in Mixing, Calendaring, Extrusion, Tyres Building, Curing and Tyres Uniformity for various category of tyres with global manufacturers.



Investment (Per Delegate)

On campus Course (3 Days) : INR 31,999/-

Overseas Candidates : USD 425/-

- 18% GST Extra (Only for Indian delegates)
- 5% Discount on nomination of 4 delegates from same organization
- 5% Early Bird Discount is applicable till 15th August 2024.
- 25% flat discount to Students and IRI life members (Students must be presently enrolled in full time in an accredited Institute/ university and IRI life membership must be prior to March 2024.
- Course fee includes Certificate, Study Material , Lecture Hall, Lunch , Tea & Snacks
- Fee is non-refundable / Non- Adjustable, however change in nomination can be accepted

About Venue—Mysuru, Karnataka

Mysuru is a beautiful city in southern Karnataka, 200 kms from Bengaluru. It is famous for Chamundeshwari Devi Temple, Mysore Palace, silk Industry, sandalwood and spices. Mysore is one of the leading tourist place in India and gateway to hill stations such as Ooty & Coorg.

On Campus Venue : Seminar Hall, First Floor, CMS Building, JSS Technical Institution Campus, Mysuru—570 006

To Register, please visit www.iri.net.in or write to iri-dbcoe@crytmail.com.

For accommodation, please write separate mail to iri-dbcoe@crytmail.com. We have corporate tie-up with many leading hotels in the city in different budget.

International delegates can approach us for assistance in Visa requirements.

Program Director —DR. R Mukhopadhyay, Chairman (IRI)

Program Co-Ordinator —Vitesh Kumar Giri, Principal Consultant , CRyT Innovation

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