

vi). All the participants are invited for a special dinner on the 12th July, 2019 evening where the certificates shall be awarded to the participants.

WHO WILL DELIVER THE LECTURES?

Lectures shall be delivered by Prof Dr Golok Bihari Nando former Professor of Rubber Technology Center, IIT Kharagpur and selected faculty drawn from IIT Bhubaneswar, IIT Kharagpur and CIPET, Bhubaneswar. Some industrial experts shall also be invited.

ACCOMODATION: Accommodation are available on payment basis in hotels close the course venue. The venue is IIT Kharagpur Extension Center, Samantapuri Campus, Bhubaneswar-751013, located strategically in the heart of the temple city, is surrounded by a number of good hotels. To name a few: Hotel Atmaram, The Ginger, The Swosti Premier, The Pal Heights and Sandy Towers. Hotels may be booked directly through internet by the participants in advance. A few hostel rooms in ANK Hostel, IIT Bhubaneswar are available close to the venue for the students participants attending the course with prior intimation.

PAYMENTS: Payment of the Registration fee of Rs.18,000/- shall be made in advance in the form of a demand draft drawn in favour of CEP, IIT Bhubaneswar and be sent through speed post or registered post to the Co-ordinator, STC BRC Prof(Dr). Golok B Nando, Professorial Fellow, SMMME, Room No:306, SIF Building, IIT Bhubaneswar, Arugul Campus, Jatani-752050, Odisha.

Online transfer of the course fee may be done through NEFT to A/C No.24282010001960, IFSC Code:SYNB0002428, Syndicate Bank, Samantapuri, Bhubaneswar-751013. When online transfer is done, a Xerox copy of the payment slip be sent to the Co-ordinator Prof Dr Golok B Nando at the aforesaid address.

PROGRAM:

The program shall commence on 8th July, 2019 (Monday) at 8.00 AM and end on 12th July, 2019 (Friday) at 6.00 PM. There will be 30 lectures, two tutorials and three laboratory practical demonstrations. All the participants are advised to be present by 8th morning at the venue one hour prior to the commencement of the programme for registration.

ORGANISING COMMITTEE MEMBERS :

Chief Patron :

Prof. R.V.Rajakumar, Director, IIT, Bhubaneswar

Patron:

Prof . S.K. Mohapatro, Dean, Continuing Education, IIT, Bhubaneswar

Chairman:

Prof .Sujit Roy, Head, SMMME

Co-ordinator:

Professor Golok B Nando, Professorial Fellow, SMMME

Treasurer :

Dr. Kodanda Ram Mangipudi, Asst. Professor, SMMME

ADDRESS FOR CORRESPONDENCE :

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SHORT - TERM COURSE ON BASICS OF RUBBER COMPOUNDING (STC BRC)



July, 08-12, 2019

Organised by

Professor Golok Bihari Nando

Co-ordinator

Former Professor of Rubber Technology Centre

IIT Kharagpur and Professorial Fellow,

At

**SCHOOL OF MINERALS, METALLURGICAL
AND MATERIALS ENGINEERING (SMMME)**

IIT BHUBANESWAR, Arugul Campus,

Jatani – 752050, Odisha



INTRODUCTION:

Bhubaneswar is the Capital City of Odisha and is popularly known as the temple city of India. Thousands of Shiva temples are located in and around the city built nearly 900 years back among which Lingaraj temple the tallest among all stands as unique shrine reminding of the past. It also houses Buddhist caves like Khandagiri and Udayagiri on the outskirts of the city where Buddhist monks were residing more than 1500 years back. Not faraway from the city Dhauligiri is located as the finest Buddhist Shrine.

Presently, Bhubaneswar is a smart city and an education hub harbouring engineering and technical education to students and scholars from all over the country.

THE INSTITUTE :

Indian Institute of Technology Bhubaneswar was established by an act of the MHRD , Govt of India in the year 2008 under the broader expansion programme in the IIT system of the country. The campus is located at Arugul nearly 40 kms away from Bhubaneswar at the foothills of Barunei the place where the first voice for Independence was raised against the British occupation infamously known as the Paik Bidroha.(Paik Revolution 1810-1817). It is a green patch of land having a serene environment. The Institute has seven academic schools covering different disciplines of Engineering and Sciences. The School of Minerals, Metallurgical and Materials Engineering offers a wide spectrum of courses covering all important aspects of modern engineering materials. Elastomers, thermoplastics, polymer nano-composites and resinous composite materials stand as unique class of engineering materials replacing conventional materials like metals and ceramics in almost all areas of engineering and medical sciences. The school has eight regular faculty and four visiting/adjunct and honorary faculty having expertise in various areas of engineering materials.

OBJECTIVE OF THE COURSE:

The objective of the course is to offer the basics of rubber compounding, to the practising engineers, technicians and fresh graduates in order to enhance their skill and knowledge in the field of rubber technology. This includes; Natural and synthetic rubbers, compounding ingredients, the principles of compounding, science behind processing, shaping and setting operations, vulcanisation chemistry. Preliminary idea about manufacturing process of rubber products, testing and quality control of the finished articles.

TOPICS TO BE COVERED:

Natural Rubber: Preparation, composition of latex, concentration, coagulation, DRC, ISNR grades and RSS grades, Chemical formula, Molecular weight, Crystallinity, Chemical and physical properties, hysteresis, elasticity, glass transition temperature and stress-strain behaviour.

Synthetic elastomers: Tire rubbers such as SBR, BR, IIR, Halogenated IIR, tire formulations, brief manufacturing procedure.

Compounding : Mastication, Open mill mixing, basic ingredients, special chemicals and additives, reinforcing fillers; carbon black and silica, diluents, effect of particle size and structure. Principles of compounding, order of addition. Compatibility, polarity, distribution and dispersion, solubility, blooming and/or bleeding.

Internal Mixing : Type of mixers, methods of mixing, control parameters, fill factor, automation (in weighing, time and temperature), process quality control. Specific requirements for silica and silane technology.

Processability : Viscosity, Process ability tester, Effect of shear rate, shrinkage, nerve, tack and so on.

Vulcanization: Basic Chemistry of vulcanization, Cross-linking agents, Scorch, Optimum cure time, Cure rate, Effect of different cure systems on properties, Relationship between temperature and time, Heat transfer media and curing methods, steam vulcanization and continuous vulcanization.

Standard Test methods: Basic tests for vulcanised rubbers; Hardness, SG, Tensile properties under static and dynamic conditions, Tear strength, product specific tests; abrasion, creep, compression set test, flex crack resistance, ozone resistance, accelerated ageing tests, oil and fuel resistance tests as well as fluid resistance (acid and alkali) tests with respect to specific products.

Shaping operations : Moulding, Extrusion Calendaring and Mould design.

Sustainability : Use of recycled materials, Tire crumb, Reclaim rubber, de-vulcanized rubber. Pyrolytic carbon black and recovered process oil.

Venue: IIT Kharagpur Extension Center, Samantapuri campus, Bhubaneswar – 751013.

Course Duration : 8th July, 2019 to 12th July, 2019.

WHO CAN ATTEND THE COURSE?

Practising Engineers, Scientists and technologists, Laboratory Technicians working in different rubber and polymer industries and research laboratories. In addition, fresh graduates in science , engineering and diploma holders in Mechanical and Chemical Engineering and other disciplines are eligible to attend this course.

REGISTRATION Fee: Being a self supporting programme a registration fee of Rs. 18,000/- per head has been fixed. This registration fee shall have to be paid in advance by the participants which will cover the following aspects;

- i). Free to attend all the lectures to be delivered by the experts in this field for all the five days.
- ii). Tea/Coffee to be served during tea break in the morning and afternoon sessions
- iii). Lunch shall be served for all the five days.
- iv). The lecture materials compiled in the form of a book shall be handed over to each participant.
- v) A kit containing, a writing pad, a pen and the lunch coupons shall be provided



To :

Professor Golok B Nando

Co-ordinator, (STC BRC)

Balmiki-2-203, Debashram Apartments,
Kesura, Bhubaneswar-751002, Odisha.

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+91 674 2383034

e-mail : nandogb@iitbbs.ac.in; golokrtc@gmail.com



**Registration form
Short Term Course on Basics
of Rubber Compounding (STC BRC)
July 08-12,2019**

Name :

Designation:

Qualification:

Organisation:

Date of Birth:

Male/Female:

Address for correspondence:

Phone:

E-mail:

Payment Details:

Demand draft number and date/

Online payment details:

Amount:

Signature of the candidate:

Recommended/Not recommended:

Sponsoring organisation:

Signature of the sponsoring authority :

Name and Designation of the sponsoring
authority:

(Registration form complete in all respects shall
reach the co-ordinator latest by 1st July, 2019 at
the address given overleaf).