SCIENCE AND TECHNOLOGY OF WEFT AND WARP KNITTING

PROF. BIPIN KUMAR
Department of Textile Engineering
IIT Delhi

TYPE OF COURSE: Rerun | Core | PG | UG
COURSE DURATION: 12 weeks (26 Jul’21 - 15 Oct’21)
EXAM DATE: 24 Oct 2021

INTENDED AUDIENCE: Students, Lecturer, Researchers, Designer, Industry Experts
INDUSTRIES APPLICABLE TO: Voltas Pvt. Ltd.(Textile Machinery Division), Laxmi Industries, High Performance Textiles Private Limited, Texzium International Private Limited, Vertex Machinery Works, Elex India

COURSE OUTLINE:
This course introduces the process of “weft and warp knitting” including its Science, Engineering, Technology and Design. The contents of the lectures have been systematically arranged to start from the basics of simple knit design, and then progressing towards Engineering of Advanced knitted structures and their Technologies.

ABOUT INSTRUCTOR:
Dr. Bipin Kumar is currently working as an Assistant Professor in The Department of Textile Technology at IIT Delhi. Prior to joining IIT Delhi, he worked as Research Assistant Professor (2016-2017) at The Hong Kong Polytechnic University, Hong Kong. He graduated from IIT Delhi, with a PhD in Textile Engineering in 2013. After PhD., he served as Postdoctoral Scholar at The Hong Kong Polytechnic University (2013-2014) and The University of California Davis (2014-2016). He is the first recipient from India to be selected for the Fulbright Postdoctoral Program (2013-14) in the field of textiles. His main research focuses on Textile Fabric Structures and Mechanics. He has over 30 publications in leading refereed SCI journals of materials, textiles and medical fields, 4 Patents, 2 Authored book, 10 book chapters, and over 30 conference proceedings. He holds editorial membership of several international refereed journals including AATCC Journal of Research, JEFF, FTTE and CTFTTE. For his outstanding contribution in research and teaching, he received several prestigious awards including IIT Delhi Teaching Excellence Award (2018), IEI Young Engineer Award (2018-19), ACP outstanding Material Scientist Award (2014), DST INSPIRE Faculty Award (2016), and Award for Excellence in Postdoctoral Research (2016). Currently, he is involved in several start-up ventures in commercializing smart e-textile products for healthcare applications.

COURSE PLAN:

Week 1: Introduction to Knitting
Week 2: Single Bed Weft Knitting Technology (Flat & Circular)
Week 3: Double Bed Weft Knitting Technology (Flat & Circular)
Week 4: Weft Knit Constructions and their Notation
Week 5: Weft Knit - Fabric Design and Structure-property Analysis
Week 6: Knitting Calculation
Week 7: Advanced Weft Knit Designs and Technology
Week 8: Introduction to Warp Knitting
Week 9: Warp Knit Constructions - Lapping Diagram and Plan
Week 10: Swinging and Shogging Motion Control in Warp Knitting
Week 11: Warp Knit Fabrics - Design and Structure-property Analysis
Week 12: Technical Applications of Weft and Warp Knit Structures