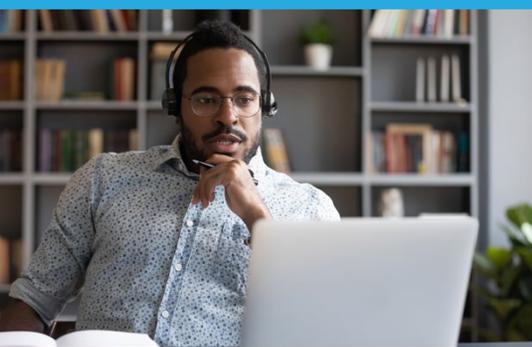


2021 PROFESSIONAL DEVELOPMENT COURSES—Done Virtually!



OCTOBER 4–8, 2021



This year IWCS will present the annual core courses of Copper 101, Fiber 101, Materials 101 and Extrusion 101 through our live, virtual platform. Participants receive real-time education with experienced instructors in virtual classrooms—allowing you to learn, engage in conversation, ask questions, and download files on demand—all from the comfort of your own home or office! The four core courses will provide those new to our cable & connectivity industry with basic technology information. Over time, students completing the four core courses, along with two electives offered during live-event years, will be presented with an IWCS Professional Development achievement plaque.

2021 PROFESSIONAL DEVELOPMENT COURSE SCHEDULE

Monday, October 4, 2021		
8:30 AM — 12:00 PM Eastern USA	Materials 101 (MA101)	Extrusion 101 (EX101)
Friday, October 8, 2021		
8:30 AM — 12:00 PM Eastern USA	Copper 101 (CU101)	Fiber 101 (FO101)

CELEBRATE 70 YEARS WITH IWCS



2021 PROFESSIONAL DEVELOPMENT COURSE DESCRIPTIONS

MA101: SELECTION & USE OF MATERIALS IN WIRE & CABLE

The course is intended for all wire and cable practitioners including raw material suppliers, cable manufacturers, and end users interested in gaining a broad understanding of applied material selection as it relates to cable performance.

INSTRUCTORS:

Dr. Mohamed Esseghir
Principal Research Scientist
Dow, Collegeville, PA, USA

Dr. Paul Brigandi
Application Development Leader
Dow, Collegeville, PA, USA

DESCRIPTION:

In this course, the selection and implementation of polymer materials used in the construction of wires and cables will be reviewed. The course will focus on polymer materials utilized in telecommunication cable applications with focus on twisted pair, coaxial, and fiber optic cables. An overview of the materials science essential to the polymer properties and additives employed in cable compounds will be covered to level-set all attendees. Further, the fundamental characteristics (advantages and disadvantages) of materials will be presented which can be then considered in selecting a material for use in a finished cable construction, with specific sections covering jackets, insulations and fiber optic materials. In addition, the effect of additives on material performance will also be discussed, particularly those that impart ultraviolet resistant and flame retardant properties on the materials.

For each of the different items (extruder, X-head, even cooling) evoked in the course, we will try to give some practical hints in relation with a more theoretical approach.

EX101: THE ART AND SCIENCE OF EXTRUSION MACHINERY FOR WIRE AND CABLE

Provides a basic analysis tool for identifying potential machinery bottlenecks due to the extrusion group, so as to solve issues which are hampering productivity and quality.

INSTRUCTORS:

Dr. Stéphan Puissant
Process Manager
Nexans Research Center, Switzerland

Mick Hundley, PE
Technical Manager
LyondellBasell, Cincinnati, OH, USA

Dr. Steven W. Horwatt, *Product and Application Development Scientist*
Equistar Chemicals, LP a LyondellBasell Company, Cincinnati, OH USA

DESCRIPTION:

The complete extrusion process is complex and involves a lot of machines having each a different function. The heart of the process being extrusion, we focus in this course on the extrusion group, i.e. extruder and cross head (distributor and tooling).

The single screw extruder seems to be a very simple machine. However, the extrusion process is complex as it is governed by interacting laws from different mechanical engineering fields i.e., thermodynamics, flow mechanics, properties of solid and molten polymers etc. Therefore, in a first step, the physical characteristics (viscosity, conductivity, melting) of polymers used in extrusion are presented. These properties will be the keys to understand the functioning of the thermoplastics extrusion process.

The material basis being covered, the focus will shift on the functioning of the single screw extruder. There the 3 functional zones of the extruder are introduced. For each zone, we will see its functioning in relation to material properties. This mechanism having been described, we will obtain some hints of the optimal screw designs (for some broader plastic families!), so as solutions which may be used to solve problematic issues.

After being plastified (molten), the polymer will be formed in its final shape by some extrusion head. In this part of the course, the basics of distributor design according to the materials are presented. After discussing the effects of distributor geometries, we will also compare different tool designs. And the influence of temperature settings on concentricity, adhesion and surface quality will be shown.

For each of the different items (extruder, X-head, even cooling) evoked in the course, we will try to give some practical hints in relation with a more theoretical approach.

2021 PROFESSIONAL DEVELOPMENT COURSE DESCRIPTIONS

CU101: FUNDAMENTALS OF COPPER CONDUCTORS & METALLIC CABLE DESIGN & APPLICATIONS

Introduction to the design and application of copper conductor communications cables.

INSTRUCTORS:

Trent Hayes, *Engineering Director*

CommScope, Inc., Claremont, NC, USA

Larry Bleich, *Engineering Director*

CommScope, Inc, Catawba, NC, USA

DESCRIPTION:

An introduction to the design and application of copper conductor communications cables. Students will understand how coaxial, twisted pair and twin axial cables are designed and how they operate upon completing the class. The instructors will provide background material on the history of copper cabling followed by sections on applications, design and construction of cables. Current standards and design examples are also reviewed by the instructors. Materials that are typically used in copper conductor communication cables will be incorporated at a fairly high level into the design exercises.

FO101: FUNDAMENTALS OF OPTICAL FIBERS & FO CABLE DESIGN & APPLICATION

Overview of optical fiber fundamentals and optical cable design principles to those new to the fiber optic cables.

INSTRUCTOR:

Corey Keisler, *Senior Development Engineer*

Corning Optical Communications, Hickory, NC, USA

DESCRIPTION:

This course will explore several aspects of optical fiber and cable design technology with particular focus on products for communications. It will discuss application considerations to select a product appropriate for a given installation environment and the basic considerations necessary for successful design of optical fiber cables.

The first part of this course will outline the characteristics and fundamental operating principles of optical fibers and the key differences between Single-Mode and Multimode optical fibers. Included will be critical fiber parameters and their impact on system performance. Specific topics will include the Advantages of Optical Fiber, Optical Fiber Manufacturing, Total Internal Reflection, Attenuation, Dispersion, Polarization Mode Dispersion (PMD), Cutoff Wavelength and other optical parameters critical to optical communications.

The second part of this course will explore the functional requirements of optical fiber cables and some of the fundamental design equations which can be used to ensure a cable will meet a given installation or operational requirement. The course will also discuss selection of a product appropriate for a given installation environment. Structural differences between cables for indoor, outdoor, and specialty applications will be explored including stranded loose tube cables, central and stranded tube ribbon cables, tight buffered cables and optical power ground wire cables.



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