NEW

EOS/ESD ASSOCIATION, INC. ONLINE ACADEMY COURSE

April 24-25, 2019 11:00AM-12:30PM EST

FC220: Device Technology & Failure for the Program Manager

Terry Welsher, Dangelmayer Associates, LLC

Certification: PrM

This tutorial provides an overview of the device technology used to provide ESD protection, ESD protection techniques, and Failure Analysis (FA) techniques to debug non-working ESD protection. This class does not go into the depth necessary to equip the student to be an ESD Protection Designer or an ESD Failure Analysis Engineer. It does familiarize the student with the terms and concepts of ESD protection and FA to allow the student to interact and understand the work being done by the Designer or Failure Analyst. After completing this tutorial the student should be able to understand the basics of device ESD protection design and some of the trade-offs inherent in that process. The student should also be familiar with the most com¬monly used failure analysis techniques and tools used to identify the root cause of an ESD failure. The topics covered include: the three most common ESD Models: HBM, CDM and System Level (IEC); characteristics of ideal ESD protection; ESD failure analysis schemes; key characteristics of real ESD protection; failure analysis flow; failure analysis tools and how they are ap¬plied to ESD failures.

Dr. Terry L. Welsher retired from Lucent Technologies-Bell Laboratories Engineering Research Center in 2001, as the director of the quality, test, & reliability department. He began his career in Bell Labs in 1978; where he worked on electrical conduction mechanisms in insulating polymers and electrolytic corrosion failure mechanisms in electrical interconnection materials. In 1984, he was appointed distinguished member of technical staff for his work in these fields. In 1986, he was promoted to technical manager to re-constitute the Bell Laboratories core expertise in electrostatic discharge (ESD). The newly formed group proceeded to produce a string of ground-breaking contributions to the field and played a key role in advancing industry standards. In 1994, he broadened his group's activities to all aspects of hardware reliability for Lucent Technologies with special emphasis in environmental stress testing (EST) and product reliability prediction and planning. In 1997, he was promoted to director of the quality, test & reliability center of excellence where he directed the development and deployment of product quality, test and reliability assurance practices for Lucent Technologies business units. This work included design for testability of integrated circuits, board and system level test and diagnosis and special techniques for testing of RF and optoelectronic systems and components. After leaving Lucent, he became reliability director for LaserSharp Corporation, an optical fiber laser amplifier company, where he was responsible for product quality, reliability, and compliance. Since 2004, he has been senior vice president of Dangelmayer Associates, LLC, an EOS/ESD consulting firm. Dr. Welsher was chairman of the ESD Association standards committee 1988-1989. He was technical program chair in 1991, vice general chair in 1992, and general chair in 1993 of the EOS/ESD Symposium. He served as member of the Symposium board of directors 1993-1995. He has also been active in quality standards and road mapping activities with Sematech, the EOS/ESD Association, and the JEDEC 14 quality and reliability committee. He served on the board of directors of JEDEC 1999-2001. He is currently co-chair of the joint JEDEC/ESDA HBM and CDM ESD working groups, and member of the Board of Directors and Past President of the EOS/ESD Association. Recently, he has led the effort to harmonize and merge JEDEC and ESDA device testing standards. He holds a BS in chemistry from Florida State University and a PhD in chemical physics from the University of Texas at Austin. He is author or co-author of fifty papers in solid state physics, applied mathematics, organic chemistry, electronics reliability, and electrostatic discharge. For his contributions to the ESD Association, Terry was presented with the Outstanding Contribution award in September 2016.

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NEW COURSES

✓	Dates	Course Title	Cert.	#Credits
	April 24-25, 2019	FC220: Device Technology & Failure for the Program Manager	PrM	3

RECORDED ON-DEMAND COURSES

✓	#	Course Title	Cert.	#Credits
		3D Integration with Through-Silicon Via (TSV)		1
	FC363	Advanced ESD/EMI Auditing Techniques		1
	DT300	Advanced HBM – Dealing with Tester Parasitics, High Pin Count and Two Pin Testing	D	1
	DT200	CDM Testing Essentials	D	1
	FC171	Changes to ANSI/ESD S20.20 from the 2007 version to the 2014 version		1
	GP230	Charged Board Events: A Growing Industry Concern		1
	DD200	Charged Device Model Phenomena, Design and Modeling	DD	3
	FC110	Cleanroom Considerations for the Program Manager	PrM	3
	FC211	Compliance Verification: Pitfalls of Auditing		1
	FC180	Controlling ESD in Automated Equipment by Proper Grounding		1
	FC241	Developing a Compliance Verification Program		1
	DT202	Device Stress Testing Standards Update	D-R	1
	FC215	Device Technology & Failure Analysis Overview	PrM	3
	DT230	Device Testing Correlation to Root Cause Failure Analysis		1
	FC261	Electric Fields: Practical Considerations		1
	FC360	Electrical Overstress (EOS) in Manufacturing and Test		3
	FC260	Electrostatic Attraction		1
	FC380	Electrostatic Calculations for the Program Manager (4 Hrs)	PrM	3
	DD104	Electrostatic Discharge Effects In Integrated Circuit Technologies		1
	GP250	EOS-A Big Challenge in Today's Handling of Customer Rejects		1
		EOS: A New Focus		1
	DD110	ESD from Basics to Advanced Protection Design	DD	
	DT140	ESD Fundamentals I for Stress Testing	D	1
	DT141	ESD Fundamentals II for Stress Testing	D	1
	GP331	ESD Problem Solving		1
	DD201	ESD Protection and I/O Design		3
	FC210	ESD Standards Overview for the Program Manager	PrM	3
	DD220	ESD Test Simplification with Approved Sampling Methods in HBM	D-E	1
	DT143	Essentials for Controlling the ESD Work Area	D	1
	DT142	Fundamentals of Failure Analysis	D	1
	DT130	Fundamentals of System Level Testing	D-E	1
	FC231	Grounding in an Electrostatic Protected Area **Chinese**		
	FC231	Grounding in an Electrostatic Protected Area		1
	DT100	HBM & MM Testing Essentials	D	1
	DT211	High Speed Digital Oscilloscope Fundamentals	D	1
	FC181	Highlights and key concepts of Footwear/Flooring Standards		1
	FC181	Highlights and key concepts of Footwear/Flooring Standards **Korean**		1
	FC181	Highlights and key concepts of Footwear/Flooring Standards **THAI**		1
	DT131	HMM – System Level Testing of Components	D-E	1
	DD103	Integrated Circuit ESD Fundamentals		3
	DD231	Integrated ESD Device and Board Level Design		2
	FC120	Ionization Issues and Answers for the Program Manager	PrM	3
	DD112	Latch-up Fundamentals	DD	1
	DT201	Latch-up Testing and Troubleshooting	D-E	1
	DD102	On-Chip Protection in RF Technologies	DD	1
	GP330	Overview on Efficient and Reliable System-Level ESD		1
	FC200	Packaging Principles for the PrM	PrM	3
	DD222	Practical Aspects of Latch-Up for Low Voltage CMOS: Design Rules, Layout Floor Planning, and Test		1
	DD132 FC132	Susceptibility Testing of Devices and Systems		1
	DD130 FC130	System Level ESD/EMI: Testing IEC & Other Standards	PrM DD	3
	DD117	TCAD Fundamentals		1
	DD205	TCAD Methodologies for Industrial ESD Design		1
	DD210	TLP Fundamentals–Understanding the Equipment Options	D-E	1
	FC361	Ultra-sensitive (Class 0) Devices: ESD Controls and Auditing Measurements		3

(PrM) (DD) Taking this online class will fill the requirement for the full length tutorial that is a requirement of the ESDA Certification Program curriculum. Details on the Professional Certification Programs offered by ESDA are on our website at www.esda.org/certification.html.

(D)Core class (D-E)Elective (D-R)Renewal class - Device Stress Testing Certification Courses-required and elective courses of the ESDA Device Stress Testing Certification curriculum. Details on the Professional Certification Programs offered by ESDA are on our website at www.esda.org/certification.html.

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