



## EOS/ESD ASSOCIATION, INC.

### ONLINE ACADEMY COURSE PATHWAYS

The main category organizes courses as shown on the top of each chart: **Foundations/Fundamentals, Methods/Practices, Assessment, Explanatory, or Special Topics.**

**Foundations/Fundamentals** - essential courses for the development and implementation of ESD control or design

**Methods/Practices** - courses that provide evaluation techniques and implementation criteria of ESD control or design

**Assessment** - courses that provide verification techniques for process compliance and robustness

**Explanatory** - courses that provide highlights, updates, and information

**Special Topic** - courses that cover emerging or specific aspects of ESD control or design

Course levels organize courses underneath the categories: Basic, Intermediate, or Advanced.

- Basic-Foundation or Introductory courses
- Intermediate-Next level course
- Advanced- Highest Level of Technical content

Courses are organized on the left side of the charts by course area: Analysis, Design, ESD Control, or Testing.

- **Analysis**
- **Design**
- **ESD Control**
- **Testing**

The Online Academy course pathways companion document provides detailed information about each course. You can find the course numbers, title, certification program, abstracts, and learning outcomes in this document to learn more about each course. Additionally, this companion document provides the skill sets each course contains. Using this file, you can search and sort by Category, Level, Area, Skill, title, and course number.



## EOS/ESD ASSOCIATION, INC. CERTIFICATION PROGRAMS

EOS/ESD Association, Inc. has several certification courses and programs.

### Device

- Device Stress Testing
  - The ESD Device Stress Testing Certification is intended for individuals who are involved in ESD or Latch-Up stress testing ranging from qualification to TLP testing for ESD development. This certification ensures that a person has the latest information on the ESD standards used in industry along with an overview of the technical background to perform the tests or understand the testing results. In addition to learning the recommended test methodologies, a person will be exposed to common pitfalls in interpreting the standards and applying it to the testing procedures used in the lab.
- Professional Device Design
  - The Device Design Certification is a professional certification for ESD Certified Professional Design Engineers. This Program is intended for individuals who are involved in designing, characterizing, and implementing improved ESD protection designs. The requirement for certification is 10 courses and passing the Device Design Exam.
- ESD Design Engineer Certification (EDEC)
  - This certification provides courses that give the foundation for ESD Design Engineers. Courses cover integrated circuit ESD, protection designs, testing essentials, troubleshooting, failure analysis and TLP fundamental.
- ESD for Circuit Design Engineers Certification (ECEC 1)
  - The EOS/ESD Association's ESD for Circuit Design Engineers Certification provides the circuit design engineer with the knowledge and the skills to implement ESD protection circuits and latch-up mitigation on their integrated circuit (IC) designs using industry proven best practices.



## **Manufacturing – Factory Control**

- ESD Control Program Associate
  - This is comprised on three online classes and a knowledge assessment test. It provides the Basics of ESD, necessary fundamental information, the How To's of measurement and equipment, and a one day S20.20 class meant to provide an introduction to control program basics and auditing.
- Professional Program Manager
  - EOS/ESD Association, Inc. offers a professional certification for ESD control program managers. This program is intended for individuals who are involved in designing, implementing, managing, and auditing ESD control programs in their facilities.
- ESD Control Program Auditor Certification
  - EOS/ESD Association's ESD Control Program Auditor certification provides an understanding of the ANSI/ESD S20.20-2021 standard and how its requirements provide a framework to control the risks of electrostatic discharge (ESD) within an organization. The certification teaches the knowledge and skills needed to successfully integrate ESD Control Program audits within an organization's quality management system internal audit program. Resources, such as; checklists, training slides, and guidance documents will be made available to attendees.

## **Facility**

- ANSI/ESD S20.20 Facility Certification
  - To meet the global need in the electronics industry for technically sound ESD Control Programs, EOS/ESD Association, Inc. established an independent third-party facility certification program. The program is administered by EOS/ESD Association, Inc. through country accredited ISO9000 certified bodies that have met the requirements of this program. The Facility Certification Program evaluates a facility's ESD program based on the industry standards ANSI/ESD S20.20 or IEC 61340-5-1.



## EOS/ESD ASSOCIATION, INC.'S MANUFACTURING CERTIFICATION ROADMAP

	Foundation (Level 1)	Associate (Level 2)	Professional (Level 3)	Expert (Level 4)
ESD Control Program Management		<div style="background-color: #90EE90; padding: 5px; display: inline-block;">ESD Control Program Associate</div> ↓ <div style="background-color: #FFD700; padding: 5px; display: inline-block;">ESD Control Program Coordinator</div>	<div style="background-color: #90EE90; padding: 5px; display: inline-block;">ESD Control Program Manager</div>	
ESD Control Program Auditing			<div style="background-color: #90EE90; padding: 5px; display: inline-block;">ESD Control Program Auditor</div>	
ESD Control Program Measurements		<div style="background-color: #FFD700; padding: 5px; display: inline-block;">Compliance Verification Technician</div> <div style="background-color: #FF69B4; padding: 5px; display: inline-block;">Product Qualification Technician</div>	<div style="background-color: #FF69B4; padding: 5px; display: inline-block;">ESD Process Assessment Engineer</div>	

## EOS/ESD ASSOCIATION, INC.'S DEVICE CERTIFICATION ROADMAP

	Foundation (Level 1)	Associate (Level 2)	Professional (Level 3)	Expert (Level 4)
Device Design		<div style="background-color: #90EE90; padding: 5px; display: inline-block;">EDEC 1</div> <div style="background-color: #90EE90; padding: 5px; display: inline-block;">Device Design</div>	<div style="background-color: #FFD700; padding: 5px; display: inline-block;">EDEC 2</div>	
Testing	<div style="background-color: #90EE90; padding: 5px; display: inline-block;">Device Stress Testing</div>			
Circuit Design		<div style="background-color: #90EE90; padding: 5px; display: inline-block;">EDEC 1 ESD Circuit Design for Engineers</div>	<div style="background-color: #FF69B4; padding: 5px; display: inline-block;">EDEC 2 ESD Circuit Design for Engineers</div>	

Legend:

Planned

In Development

Currently Available



# EOS/ESD ASSOCIATION, INC.'S FACILITY CERTIFICATION ROADMAP

	Certification			
ESD Control Program Management		<p>S20.20 Facility Certification</p> <p>Product Qualification Laboratory Certification</p>		
Device Stress Testing		<p>Device Stress Testing Facility Certification</p>		

Legend:

Planned

In Development

Currently Available



	Foundations/Fundamentals		
	Basic	Intermediate	Advanced
Analysis	DT142 Fundamentals of Failure Analysis	FC380 Electrostatic Calculations for the Program Manager and the ESD Engineer	
	DD213 ESD, EOS and Latch-up Failure Analysis for Designers		

D e s i g n	CD1-6 ESD/Latchup Product Testing Basics	DD100 ESD Circuits	DD200 Charged Device Model Phenomena, Design and Modeling
		DD103 An Overview of Integrated Circuit ESD: The ESD Threat, Testing, Design Concepts and Debugging	
		DD104 Electrostatic Discharge Effects in Integrated Circuit Technologies	DD300 Circuit-Level Modeling and Simulation of On-Chip Protection
	CD1-8 ESD Factory Control Basics	DD110 ESD From Basics to Advanced Protection Design	IF21-1 System Level ESD & EMC Design
		DD201 ESD Protection and I/O Design	
		DD214 Latchup Physics and Prevention	IF21-5 Tech Needs for ESD Enablement: Impact of Technology Parameters, Technology Scaling vs. ESD Design
		CD1-2 Basics of ESD and Latch-up device physics	



Foundations/Fundamentals			
	Basic	Intermediate	Advanced
E S D  C o n t r o l	FC100 ESD Basics for the Program Manager	FC101 How To?s of In-Plant ESD Auditing and Evaluation Measurements	FC340 ESD Program Development and Assessment (ANSI/ESD S2020 Seminar)
	FC105 Safe Equipment Handling in Your EPA Explained		
	DT140 ESD Fundamentals I for Stress Testing	FC164 Costly Controversial ESD Myths	
	DT141 ESD Fundamentals II for Stress Testing		
	DD/FC155 ESD Control Workstations: Set-up, Practical Considerations	FC262 Electrical Fields and Particles - Practical Considerations for the Factory	
	DD/FC161 Perfect ESD Storm		
	DD/FC165 ESD Control Concepts for Design, Validation, and Test Engineers		
	FC166 ESD QMS Best Practices Strategy Including Class 0		
	FC200 Packaging Principles for the Program Manager	GP331 ESD Problem Solving	
	FC231 Grounding in an Electrostatic		
	PRMAFC340 ESD Control Program Development to ANSI ESD S20.20		



	Foundations/Fundamentals		
	Basic	Intermediate	Advanced
T e s t i n g	DT100 Human Body Model Testing Essentials	IF21-6 ESD Testing: Diffferent TLP. Different IEC testing, Surge Test, etc.	
	DD/FC132 Susceptibility Testing of Devices and Systems		
	DT133 Fundamentals of ESD System Level Testing	DD231 ESD System Level: Physics, Testing, Debugging of Soft and Hard Failures	
	IF21-6 ESD Testing: Different TLP. Different IEC testing, Surge Test, etc.		





		Methods/Practices		
		Basic	Intermediate	Advanced
A n a l y s i s	DD117 TCAD Fundamentals and First Applications to ESD		DD302 Troubleshooting On-Chip ESD Failures	
			CDI-7 ESD/Latchup failures troubleshooting techniques and case studies	
D e s i g n	DD134 Fundamentals of ESD System Level		CDI-3 ESD Circuit/Chip Design Implementation (with Layout principles): Mixed-Signal/High-Voltage	CDI-5 ESD compact models and simulation
			CDI-4 ESD EDA Verification Tools	
			CDI-9 ESD System Level Basics	CDI-10 ESD circuit/chip design implementation (with Layout principles): CMOS
			FC21-2 Design Constraints of ESD Circuits for High Speed Applications	
			FC21-4 Circuit Design - Pcell, Clamps Design, Different ESD Protection Concept	IF21-3 Soc ESD Design and Verification



				Methods/Practices		
				Basic	Intermediate	Advanced
E S D  C o n t r o l	FC110 Cleanroom Considerations for the Program Manager					
	FC120 Ionization Issues and Answers for the Program Manager					
	FC121 Grounding - Variations, Concepts, Nuisances, Equipment & Troubleshooting					
	DT143 Essentials for controlling the ESD Work Area					
	FC181 Highlights and Key Concepts Footwear Flooring					
	FC181 Highlights and Key Concepts Footwear Flooring [Korean]					
	FC181 Highlights and Key Concepts Footwear Flooring [Thai]					
	FC210 ESD Standards Overview for the Program Manager					
	FC211 Compliance Verification: Pitfalls of Auditing					



				Methods/Practices		
		Basic	Intermediate		Advanced	
T e s t i n g	DT131 HMM - System Level Testing of Components (ELECTIVE)	DT200 CDM Testing Essentials				
		DT201 Latchup Testing and Troubleshooting (ELECTIVE)				
	FC150 Hands-on ESD Measurements & Instruments- Uses and Pitfalls	DT210 TLP Fundamentals - Understanding the Equipment Options and IV Data (ELECTIVE)				
		DT212 VF-TLP, An Introduction to Capabilities and Applications (ELECTIVE)				
	CDI-1 Background of ESD basics and models	DD220 Transmission Line Pulse (TLP) Basics and Applications				
		DT230 Device Testing Correlation to Root Cause Failure Analysis				
		D0240 ESD Device Qualification Testing				



	<b>Assessment</b>
	<b>Intermediate</b>
<b>E S D  C o n t r o l</b>	FC170 ANSI/ESD S20.20 - ESD Program Assessment for Internal Auditors and Supplier Quality Engineers
	FC390 Basics of ESD Process Assessment with Hands-On
	FC391 Basics of ESD Process Assessment

	<b>Explanatory</b>	
	<b>Intermediate</b>	<b>Advanced</b>
<b>D e s i g n</b>		DD208 ESD Parameters for the Foundry, IC Designer and IP/EDA Vendor
<b>T e s t i n g</b>	DT202 Device Stress Testing Standard Updates (RENEWAL)	
	DT220 ESD Test Simplification with Approved Sampling Methods in HBM (DST Statistical Sampling) (ELECTIVE)	



		Special Topic		
		Basic	Intermediate	Advanced
A n a l y s i s			FC220 Device Technology and Failure Analysis for the PrM	
			GP230 Charged Board Event: A Growing Industry Concern	
			GP250 EOS- A Big Challenge in Todays Handling of Customer Rejects (IEW)	
			DD/FC250 What information needs to be exchanged for potential EOS problem	
D e s i g n	DD318 FinFET and Advanced CMOS Technology ESD TCAD Simulations		DD150 Introduction to RF ESD Design	DD205 TCAD Methodologies for Industrial ESD Design (IEW)
			DD203 Designing ESD protection for RF and mmWave	
			DD204 ESD Design in HV Technologies	DD317 ESD Challenges in Advanced FinFET and GAA NW CMOS Technologies
			DD222 Practical Aspects of Latch-Up for Low Voltage CMOS: Design Rules, Layout Floor Planning, and Test	
			DD260 Design for EOS Reliability	DD319 Physical Process, Device and Circuit Simulation (TCAD) Methodologies in Application to Industrial ESD Research and Design
			DD311 Impact of Technology Scaling on Components High Current Phenomena and Implications for Robust ESD Design	
			GP330 Overview of Efficient Reliable System-Level ESD (IEW)	DD340 Integrated ESD Device and Board Level Design



		Special Topic		
		Basic	Intermediate	Advanced
E S D  C o n t r o l	FC165 Novel Methods for Fixing ESD Issues in the factory for both electronics & explosive products		FC115 Contamination & ESD Issues in Flat Panel Display Manufacturing Process	FC370 Basics of EMI and EOS in Manufacturing Environment and Their Mitigation
			FC180 Controlling ESD in Automated Equipment by Proper Grounding	
			DD/FC240 System Level ESD/EMI (Principles, Design Troubleshooting, & Demonstrations)	
			GP241 Ultra-Sensitivity Trends and CDM	
	FC201 ESD - A Surprisingly Frequent Root Cause of Device Failure		DD/FC330 Control of Charged Board Event (CBE)	
			FC360 Electrical Overstress in Manufacturing and Test	
			FC361 Ultra-sensitive (Class 0) Devices: ESD Controls and Auditing Measurements	
T e s t i n g		DD/FC122 Use of the Digital Sampling Oscilloscope for ESD Measurements	DT300 Advanced HBM ? Dealing with Tester Parasitics, High Pin Count Devices and Two Pin Testing	
		DD/FC130 System Level ESD/EMI: Testing to IEC and Other Standards		
		FC140 System Level for the PrM		
		DT211 High Speed Digital Oscilloscope Fundamentals		