



ELAN TECHNOLOGY PROUDLY PRESENTS A  
**Glass Science and Technology Course**

**Fall 2023 – in Person**

**November 7<sup>th</sup> – November 10<sup>th</sup> 2023**

**Instructed by:**

**Dr. Eric C. Skaar, Ph.D and P.E.**

*Learn about glass to metal sealing through  
intimate lectures and hands-on demonstrations.*

*A comprehensive advanced materials curriculum delivered  
in a practical format for real world applications.*

Elan Technology, Inc. announces the Glass-to-Metal Sealing course, which has graduated over 1000 engineers to date world wide.

**Dates:** **Tuesday November 7<sup>th</sup> – Friday November 10<sup>th</sup>, 2023**

**Instructor:** **Dr. Eric Skaar, Ph.D and P.E.**

- Associate Professor (retired), Gilbert C. Robinson Department of Ceramic and Materials Engineering, Clemson University.
- Over 30 years of experience in the field of ceramic and materials engineering.
- Author of over 70 technical publications.
- Principal Investigator responsible for numerous government and corporate sponsored research project.

**Cost:** \$800 per student (prepaid non-refundable: covers instruction, text, on-site luncheon, and dinner on 1st and 3rd evenings.) Registration is considered accepted once payment via credit card is received.

**Location:** Elan Technology – in person  
169 Elan Court  
Midway Georgia 31320

**Airport:** Savannah/Hilton Head International Airport (SAV)

- Hotel:** Per attendee's preference –suggestions below
- 15 mins to plant [SpringHill Suites Richmond Hill](#)
  - 35 mins to plant [Fairfield Downtown Savannah](#)

**To Enroll:** Please contact:  
Lacey M. Weimer 912.880.3072, [lacey@elantechnology.com](mailto:lacey@elantechnology.com)

## **Course Schedule and Lecture Topics**

### **Tuesday - Moon River Brewing**

6:00 – 8:00 PM

Introduction of Elan staff and attendees: Meet at Moon River Brewing Company, 21 W Bay St, Savannah 31401 for cocktails and heavy hors d'oeuvres

### **Wednesday– at Elan Technology**

9:00 – 9:45 AM

Introduction to Materials, and the Glassy State.

Lecture 1 – Introduction to Materials

Lecture 2 – The Glassy State

9:45 – 10:30 AM

Fundamentals

Lecture 3 – Glass Melting and Homogenization

Lecture 4 – Viscosity

10:30 – 10:45 AM

Break

10:45 – 11:30 AM

Fundamentals (Cont'd.)

Lecture 5 – Thermal Properties

12:00 – 1:00 PM

Lunch – on premises

1:00 – 2:45 PM

Glass to Metal Seals

Lecture 6 – Glass to Metal Seals

Lecture 7 – Glass to Metal Seals – Design Parameters

2:45 – 3:00 PM

Break

3:00 – 3:30 PM

Glass to Metal Seals (Cont'd.)

Lecture 8 – Recommended Glass – Metal Combinations

3:30 – 5:00 PM

Stress

Lecture 9 – Stress in Glass to Metal Seals

Lecture 10 – Stress in Glass

**Thursday– at Elan Technology**

9:00 – 9:45 AM

Considerations in Manufacturing

Lecture 11 – More Glass to Metal Seals

Lecture 12 – Furnace Conditions

Lecture 13 – Relevance of Water to Sealing

9:45 AM – 10:00 AM

Break

10:00 AM – 11:30 AM

Glass Properties

Lecture 14 – Some Other Important Glass Properties

Glass Ceramics and Other Specialty Glasses

Lecture 15 – Sealing with a Glass Ceramic

Lecture 16 – Special Sealing Glasses

Glass Processing Techniques

Lecture 17 – Spray Drying

11:30 – 1:30 PM

Elan Plant Tour

Lunch – on premises

1:30 – 3:00 PM

Glass Processing Techniques

Glass Melting

3:00 – 4:30 PM

Interactive session for design, production and troubleshooting with  
Dr. Eric Skaar and the Elan engineering staff.

Course Evaluations

Diplomas

5:00 – 7:30 PM

Outdoor Dining at Sunbury Crab Co, 539 Brigantine Dunmore Rd,  
Midway 31320

**Friday– at Elan Technology (by appointment)**

This short course is designed for persons with either a technical or non-technical background that are working in the field of glass to metal seals. In addition to learning about the manufacture, properties and use of sealing glasses through lectures and an extensive set of handouts---which each person receives at the beginning of the course---you will observe several laboratory demonstrations important to sealing glasses and tour the extensive manufacturing facilities at Elan Technology where you will observe the manufacturing of powder preforms.

A valuable part of this course is the informal exchange of information that is encouraged and promoted among the class participants and which occurs during the breaks and other times. Previous classes have indicated this exchange of information has been one of the best parts of class so we hope you will find this useful also. You are asked to bring 2 or 3 examples of the glass to metal seals which the class can observe. Furthermore, you are asked to bring along something that you can share with the class---how you solved a problem, useful “tricks” you have learned from experience, testing techniques----anything which you could share with your classmates that you feel they would find interesting.

If you have a specific topic or problem you would like discussed, time is set aside toward the end of the class for that purpose. It is helpful if you would contact Dr. Skaar at [ecskaar1@gmail.com](mailto:ecskaar1@gmail.com) or Andrew Kanjanapant, Elan Technology’s VP-Operations at [andrew@elantechnology.com](mailto:andrew@elantechnology.com) so that we have some advance notice of your topic or problem.