



ELAN TECHNOLOGY PROUDLY PRESENTS A  
**Glass Science and Technology Course**  
**Fall 2021 – in Person**

**October 26th – October 29th 2021**

**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 800 engineers to date world wide.

**Dates:** **Tuesday October 26th – Friday October 29th, 2021**

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

- Associate Professor, Gilbert C. Robinson Department of Ceramic and Materials Engineering, Clemson University.
- Over 20 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:** \$750 per student (prepaid non-refundable: covers instruction, text, on-site luncheon, and dinner on 1st and 3rd evenings.) **The hotel is not included in this price.** 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)

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

## **Course Schedule and Lecture Topics**

### **Tuesday**

4:45 PM

Elan Technology representatives will meet attendees in the hotel lobby (hotel information is provided at the time of registration.)

5:00 PM

Historic Tour of downtown Savannah via a local trolley

6:00 PM

Introduction of Elan staff and attendees: Cocktails and dinner in Savannah

### **Wednesday**

8:00 – 9:00 AM

Introduction to Materials, and the Glassy State.

Lecture 1 – Introduction to Materials

Lecture 2 – The Glassy State

9:00 – 10:30 AM

Fundamentals

Lecture 3 – Glass Melting and Homogenization

Lecture 4 – Viscosity

10:30 – 10:45 AM

Break

10:45 – 11:30 PM

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

5:00 PM  
Class Adjourned

## **Thursday**

8:00 – 9:30 AM  
Considerations in Manufacturing  
Lecture 11 – More Glass to Metal Seals  
Lecture 12 – Furnace Conditions  
Lecture 13 – Relevance of Water to Sealing

9:30 AM – 9:45 AM  
Break

9:45 AM – 12:00 PM  
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

12:00 – 1:00 PM  
Lunch – on premises

1:00 – 2:15 PM  
Group Photograph  
Elan Plant Tour

2:15 – 4:00 PM  
Glass Processing Techniques  
Glass Melting

5:00 PM  
Dinner in Savannah's Historic District.

## **Friday**

8:30 AM – 12:00 PM  
Interactive session for design, production and troubleshooting with  
Dr. Eric Skaar and the Elan engineering staff.  
Course Evaluations  
Diplomas

12:00 PM  
Class Adjourned

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 Operations Manager at [andrew@elantechnology.com](mailto:andrew@elantechnology.com) so that we have some advance notice of your topic or problem.