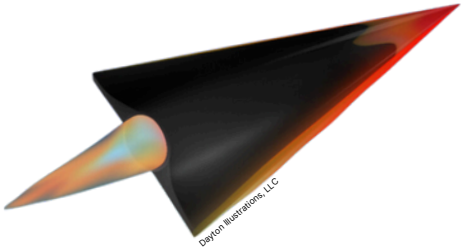
CMS 2026: Hypersonic Short Course Outline

January 25, 2026 | New Orleans, La.

Time	Module/Topic
9–9:45 a.m.	**Module 1 History of Hypersonic Flight and Design** – This introductory module will be used to help motivate the current interest in hypersonic flight as we focus on what has been accomplished in the past 70 years and current aircraft.
9:45–10:30 a.m.	**Module 2 Hypersonic Aerothermodynamics** – This may be the most important module as it provides an overarching connection between all the materials topics discussed in the remaining modules. It will provide the necessary vocabulary to understand hypersonic flight and the technical problems associated with it. This section will be used to point to materials solutions and remaining gaps of knowledge in UHTCs, CMCs, C/C. The thermal protection systems (TPS) are discussed.
10:30–10:45 a.m.	**Break: 15 minutes**
10:45–11:30 a.m.	**Module 2** cont.
11:30 a.m.–12 p.m.	**Module 3 Ceramic processing fundamentals with applications to ultrahigh temperature ceramics (UHTCs) such as ZrB2, HfB2, and HfC;** basics of colloidal processing, additive manufacturing of ceramics, and sintering essentials.
12–12:45 p.m.	**Lunch: 45 minutes**
12:45–2:45 p.m.	**Module 3** cont.
2:45–3 p.m.	**Break: 15 minutes**
3–4 p.m.	**Module 4 Introduction to Mechanical Properties of Ceramics** – The module focuses on the fundamentals of mechanical testing and data distribution manipulation. It provides context for understanding motivation to make ceramic composites.
4–4:15 p.m.	**Class Wrap up/Review**



Instructed by Prof. Rod Trice, Purdue University, School of Materials Engineering

rtrice@purdue.edu