Introduction to Engineering Design Syllabus

Academy of Advanced Aerospace Engineering | 2026-2027

Teacher	Mr. Lockwood | Instructor & Academy Chair	**Course**	Introduction to Engineering Design (IED)
Email	jlockwood@cornerstonecharter.com	**Grade Level**	9th Grade
Room	H101 / H102 / H103	**Extra Help**	After school until 4:00 PM
Platforms	Google Classroom + LockwoodSTEM.org	**Course Type**	Project-based + portfolio-based

Course Purpose

Welcome to Introduction to Engineering Design. This course is an aerospace-focused introduction to how engineers identify problems, create solutions, document ideas, and build working prototypes.

You will use sketching, measurement, Fusion CAD, technical drawings, 3D printing, materials testing, mechanisms, simple circuits, prototype testing, data analysis, engineering notebooks, and design reviews to develop your skills as an engineering student.

We will use the engineering design process throughout the course. Projects may require multiple drafts, testing, redesign, and reflection. Failure, troubleshooting, and redesign are expected parts of engineering work - not signs that a project is bad.

Course resources, updates, assignment links, due dates, and feedback may be posted digitally through Google Classroom and LockwoodSTEM.org. Check Google Classroom regularly.

What You Can Expect to Make

- Rocket launch pad design challenge prototype
- Technical sketches, reverse engineering documentation, exploded views, BOMs, and change records
- CAD part models, 3D printed tolerance testers, and rocket assembly prototypes
- CAD assemblies, fit checks, technical drawings, and final rocket assembly design packages
- Aerospace mechanisms, material tests, circuits, electromechanical prototypes, motion graphs, and test data
- A final human-centered aerospace design capstone with user research, prototype, testing data, portfolio, and presentation

Course Units

Unit	Title	Major Project / Evidence
0	Engineering Foundations & Rocket Launch Pad Challenge	Rocket Launch Pad Design Challenge
1	Technical Sketching & Engineering Documentation	3D Rocket Assembly Reverse Engineering Documentation Package
2	CAD Modeling, Parametric Design & 3D Printing	3D Printed Rocket Assembly Tolerance Tester
3	CAD Assemblies, Prototyping & Technical Drawings	Full Rocket Assembly Prototype & Technical Drawing Package
4	Aerospace Mechanisms, Materials & Electromechanical Systems	Aerospace Mechanism/Electromechanical System Prototype
5	Human-Centered Aerospace Design Capstone	Human-Centered Aerospace Design Capstone + Final Portfolio

Materials

Required Daily Materials	Optional / Recommended	Provided by School
1.5 inch 3-ring binder; pencils and erasers; pens; Sharpies; notebook paper; graph paper; earbuds/headphones; ruler; wired or wireless mouse	ANSI Z87+ safety glasses; digital or dial calipers; USB flash drive, 8GB or larger	FabLab/project materials are provided by the school unless specifically stated otherwise.

Your 1.5 inch binder is your engineering notebook. Notebook expectations will be taught in class and reinforced throughout the year.

Grading, Feedback, and Revision

This course uses a total points system. Assignments may include projects/design challenges, engineering notebook entries, classwork/skill practice, quizzes, FabLab certifications, design reviews, reflections, and presentations.

- FabLab certifications count as graded assignments.
- Assessments will usually be quizzes, certifications, projects, and presentations rather than traditional tests.
- Quizzes and certifications may be retaken. In some cases, remediation may be required before a retake at teacher discretion.
- Late work is accepted for full credit until the end of the unit.
- Project work may be revised or resubmitted after feedback until the end of the unit.

Teamwork and Individual Accountability

You will work with classmates frequently throughout the course. Team projects are still expected to show individual responsibility. Your individual grade or feedback may be based on your contribution, documentation, reflection, presentation role, and ability to support the work of the team. Peer evaluations may be used.

Absences and Makeup Work

If you are absent, check Google Classroom and LockwoodSTEM first. Then speak with Mr. Lockwood if you need clarification or missed FabLab/tool time. Makeup work timelines are at teacher discretion. During team projects, you are responsible for communicating with your team and making up your individual portion of the work.

Course Expectations

- Be safe. Make careful choices before using tools, machines, or materials.
- Be prepared. Bring required materials and be ready to work.
- Document your work. Record ideas, decisions, sketches, tests, feedback, and revisions.
- Respect people, tools, and materials. Use shared spaces professionally.
- Collaborate professionally. Listen, contribute, and solve problems respectfully.
- Clean up your workspace. Leave the area ready for the next class.

FabLab and Safety Expectations

Safety is a major part of engineering. You must complete the required safety instruction and tool certification before using tools independently. This includes 3D printers, the laser cutter, CNC mill, drill press, soldering irons, hand tools, and cutting tools.

- Do not use tools, machines, or materials without permission or supervision.
- Wear required PPE during fabrication activities, including eye protection when directed.
- Wear closed-toe shoes on fabrication days. Tie back hair and secure loose clothing, jewelry, or accessories when needed.
- Food and drinks are not allowed in FabLab/tool areas.
- Report damaged tools, unsafe conditions, or injuries immediately.
- Do not remove tools, materials, prototypes, or parts from the classroom/FabLab without permission.
- Unsafe behavior or misuse of devices, tools, or materials may result in loss of technology, FabLab, or tool privileges.

Ask for help when you are confused, behind, or unable to safely complete a task. Engineering is collaborative, and safety comes before speed.

Cleanup Policy

Cleanup is part of the work. Before leaving, return tools and materials, wipe workspaces, dispose of scrap properly, and leave the area ready for the next class.

Technology, Files, and Digital Work

Technology use is limited to school-approved devices and course-related work. Phones and personal electronics should be away unless specifically permitted for a course-related activity. You are expected to maintain appropriate digital citizenship when using school devices, online tools, CAD platforms, and AI tools. School internet, technology, and acceptable use policies apply at all times.

- Save and back up your digital work in the required location, such as Google Drive or the course submission platform.
- Lost, unsaved, or incorrectly submitted digital work may need to be redone or resubmitted.

- Use the required file naming format for CAD files, drawings, and project submissions: LastName_FirstName_Unit_AssignmentName.

AI Use Policy

You may use AI for brainstorming, feedback, organization, and revision support, but you must disclose AI use when it supports your work. AI may not replace original design work, CAD work, testing, data collection, or personal reflection. Undisclosed AI use is an academic integrity issue.

Academic Integrity

Your engineering work should represent your own thinking, effort, documentation, and contribution. Do not copy CAD files, engineering notebook entries, project data, reflections, or another student's work. Do not claim another person's work as your own. Teamwork is encouraged, but your individual role and contribution must be honest and visible.

Communication

Students should use Google Classroom and school email for course questions. Parents/guardians should email Mr. Lockwood directly at jlockwood@cornerstonecharter.com. Students are expected to check Google Classroom regularly for announcements, assignments, due dates, and feedback.

Displays, Documentation, and Opportunities

The course may involve occasional photography or video of student projects for documentation, portfolios, or class displays while following school media policies. Project work may be displayed on campus, on LockwoodSTEM, or in academy showcases. When available, the course may also include guest speakers, industry examples, academy events, or field-trip-style opportunities.

Accessibility and Support

Students with accommodations should communicate with Mr. Lockwood so course activities, tools, and project expectations can be supported appropriately. Students are also expected to advocate for help when they are confused, behind, or unable to safely complete a task.

A Final Note

Engineering is about curiosity, persistence, and improvement. This course will ask you to think, build, test, document, and revise. The goal is not to be perfect on the first attempt; the goal is to become a stronger designer and problem solver over time.

Keep this syllabus for reference. A separate signature acknowledgment page is provided so only that page needs to be printed and returned.