Title:

Be specific–the title you choose here will appear on the transcript. Titles like "structures research" are not appropriate. The student and professor should work together on a descriptive and specific title.

The title must be less than 30 characters.

- Aviation Accident Modeling
- Propellant Characterization
- Airfoil Design using ML
- Spacecraft Human Factors

Tasks:

Here are some examples of tasks that an undergraduate student might do in an independent study. Note that each task is described in detail and with specificity. Generic descriptions are not acceptable.

- Conduct literature review on…
  - Non-toxic rocket propellants for spacecraft, address current options, possible monopropellant and bipropellant replacements
  - Airfoil design using machine learning, address fundamentals of airfoils and basics of applicable machine learning techniques
  - Use of composite materials in aircraft systems, address pros & cons of composites vs. metal structures and hybrid (metal/composite) structures
  - etc.
- Assist graduate student in conducting experiments to…
  - Investigate ignition delay for different rocket propellants with drop tests setup at ambient pressure but varying ambient temperatures
  - Perform mechanical tests using a TA Instruments ElectroForce 3500 load frame to measure stiffness, strength, and durability characteristics of metal samples
  - etc.
- Collect and process data
  - Aircraft accidents in the United States: Collect NTSB reports and download NTSB Access Database. Identify accidents involving single-engine aircraft that occurred at night.
  - etc.
- Analyze data
  - Identify the top causes of night time single-engine aircraft accidents. Determine whether there are any trends in these causes
  - etc.

Deliverables

Here are some examples of deliverables that an undergraduate student might produce in an independent study. Note that each deliverable is described in detail and with specificity. Generic descriptions are not acceptable. Nor are unverifiable "deliverables" like "learn how to code"--how will the student demonstrate that they have learned how to code?

- Written literature review in a 4000 words minimum document following the standard AIAA conference paper format
- Documented experimental procedures ("Methods" section) with labeled photos of key instruments and documented settings used in experiments
- Conference-style paper on single-engine aircraft accidents, 4000 words minimum in Microsoft Word following the standard AIAA conference paper format
- Documented python code that uses machine learning to design simple airfoils with sample results in a 4000 words minimum in Microsoft Word document following the standard AIAA conference paper format