

# Space Physics Fact Sheet

Department of Physics and Astronomy  
Embry-Riddle Aeronautical University  
Prescott, AZ 86301

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## What is Space Physics?

The B.S. program in Space Physics at Embry-Riddle is the only undergraduate program of its kind. This program is designed to help students explore the physical phenomena observed in our universe, for example, the merging of black holes in nearby galaxies (the LIGO project), as well as measuring the physical parameters of nearby exoplanets using our campus observatory. The “areas of concentration” are defined by the research interests of our professors and they include:

1. Astrophysics -- study of interstellar media and galaxy formation,
2. Particle Physics – search for massive neutrinos, search for dark matter,
3. Cosmology and General Relativity – search for violations in general relativity,
4. Gravitational Waves – search for merging black holes and neutron stars in nearby galaxies.  
The LIGO Experiment (Laser Interferometer Gravitational wave Observatory)
5. Exotic Propulsion – The design of non-chemical engines to be used for manned space exploration (e.g., nuclear-thermal, matter-antimatter, etc.)

## What skills should I have if I choose to major in Space Physics?

1. You should have good to excellent math skills and be prepared to take Calculus I and calculus-based physics the first semester at ERAU.
2. If possible, you should have completed an introductory physics course and an introductory chemistry course in high school.
3. If you have taken the Calculus or Physics or Chemistry AP exam and received a 4 or 5, you can receive credit for the first semester of University Calculus, Physics, or Chemistry.

## What kind of courses are included in the Space Physics curriculum?

1. This is a B.S. degree in Space Physics, so, you can expect many of the same courses as offered in other physics degree programs such as Mechanics, Electricity & Magnetism, Statistical and Thermal Physics, Quantum Mechanics, Atomic & Nuclear Physics. However, many of these courses will have applications focused on space physics. Furthermore, there will be other courses focused on “space” such as Astrophysics I and II, Particle Physics and Cosmology, Advanced Propulsion Systems, and Remote Sensing to name a few.
2. The curriculum for the first three semesters is similar for both physics and engineering students (~80%). The fourth semester course (Modern Physics) is not required for engineers. Furthermore, physics students must take a physics lab every semester for the first 4 semesters while engineering students are only required to take one physics lab.
3. In the third year, all space physics students are required to take the optics lab. The skills learned in this lab are useful for developing high precision detectors often used explore physics at the atomic and nuclear level. During the fourth year, students have the opportunity to pursue a *senior thesis project* focusing on an experimental or theoretical investigation of a space physics phenomena.
4. The four-year rollout of the space physics courses can be found on the Space Physics website:

[http://physicsx.pr.erau.edu/SpacePhysics/Space Physics\\_4\\_years.pdf](http://physicsx.pr.erau.edu/SpacePhysics/Space%20Physics_4_years.pdf)

### **How is this degree different from other degrees at Embry-Riddle?**

1. You will learn and understand a lot more math and physics compared to other degree programs. Furthermore, you will need to use it to solve problems encountered in the study of space physics.
2. While ERAU offers many professional degrees, this is a science degree that prepares students for a career in scientific research, aerospace industry, and science education.

### **After I receive my Space Physics degree, where do I go next?**

1. Because of your hands-on experience in the physics labs, you will be prepared to work in the space industry as an industrial physicist, building equipment and experiments, and analyzing data, thus contributing to the body of knowledge in space physics.
2. Because of analytical skills and desire to study space-related phenomena, you will be prepared to work at a national laboratory such as Kitt Peak, Jet Propulsion Labs, NASA research labs, and Department of Energy labs such as Fermilab and Los Alamos.
3. Student who perform well in the Space Physics program will be academically prepared to take the physics Graduate Records Exam (GRE) and move on to a graduate program in physics, astrophysics, or space physics.

### **Our first graduating class:**

We graduated our first senior class in Spring 2007 with 20 students successfully finishing the program. The number of students going into industry, graduate school, and teaching have the typical ratio of 9:9:2 respectively. The students pursuing jobs in industry or research at the national labs are earning salaries ranging up to \$70,000.

### **Who should I contact if I have questions:**

Dr. Quentin Bailey (Program Chair)  
Department of Physics  
College of Arts & Sciences  
Embry-Riddle Aeronautical University  
3700 Willow Creek Rd.  
Prescott, AZ 86301

Office: (928) 777-3932  
email: [baileyq@erau.edu](mailto:baileyq@erau.edu)  
homepage: <http://mercury.pr.erau.edu/~baileyq/>

Dr. Brian Rachford (Observatory Director)  
Department of Physics  
College of Arts & Sciences  
Embry-Riddle Aeronautical University  
3700 Willow Creek Rd.  
Prescott, AZ 86301

Office: (928) 777-3971  
email: [rachf7ac@erau.edu](mailto:rachf7ac@erau.edu)  
homepage: <http://mercury.pr.erau.edu/~rachf7ac/>

Please feel free to contact either one of us if you have questions regarding the Space Physics or Astronomy programs at Embry-Riddle in Prescott, AZ.