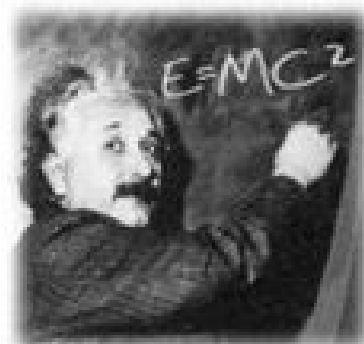


Welcome to the  
**Physics-Astronomy Major**

in the College of Physical and Mathematical Sciences

College Advisement Center

Website: <https://science.byu.edu/advisement>  
Email: [science.math.advisement@byu.edu](mailto:science.math.advisement@byu.edu)  
Phone: 801-422-2674  
Office: N-181 ESC



Physics & Astronomy Department

Website: [physics.byu.edu](http://physics.byu.edu)  
Email: [physics\\_office@byu.edu](mailto:physics_office@byu.edu)  
Phone: 801-422-4361  
Office: N-284 ESC

See [physics.byu.edu/undergraduate/advising](http://physics.byu.edu/undergraduate/advising)

Faculty Advisor – until you have a faculty research mentor, you must meet annually to discuss career and academic options with the faculty advisor assigned to you. Your faculty advisor is:

- 00-49: Aleksandr Mosenkov, [aleksandr\\_mosenkov@byu.edu](mailto:aleksandr_mosenkov@byu.edu), 801-422-4307, N-480 ESC
- 50-99: Ben Boizelle, [bozellb@byu.edu](mailto:bozellb@byu.edu), N-484 ESC

Deadlines to meet with Faculty Advisors each year (based on the last digit of your student number):

0 or 1	2 or 3	4 or 5	6 or 7	8 or 9
October 31	November 30	January 31	February 28	March 31

Internship Coordinator – David Allred

Email: [allred@byu.edu](mailto:allred@byu.edu)  
Phone: 801-422-3489  
Office: N265 ESC

University Career Services – Anna Kennington

Website: [careers.byu.edu](http://careers.byu.edu) (Handshake--see flyer in packet)  
Email: [anna.kennington@byu.edu](mailto:anna.kennington@byu.edu)  
Phone: 801-422-5944, or 801-422-2674 (schedule appointment)  
Office: C-106 BNSN

STEM Alliance--Connect with STEM employers, mentors, and clubs: [stemalliance.byu.edu](http://stemalliance.byu.edu)

Clubs

Acoustical Society of America – Contact: Brian Anderson ([bea@byu.edu](mailto:bea@byu.edu))  
BYU Astronomical Society – Contact: Denise Stephens ([denise\\_stephens@byu.edu](mailto:denise_stephens@byu.edu))  
Society for Physics Students – Contact: Benjamin Frandsen ([benfrandsen@byu.edu](mailto:benfrandsen@byu.edu))

Learning outcomes can be found here: <https://learningoutcomes.byu.edu/Courses/program-courses/694832/Physics--Astronomy+BS+/1328>

# Things to Know

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## Resources for Graduation Planning

- Flow Charts and Major Academic Plans (MAPs) can be found here: <https://science.byu.edu/advisement/flowcharts>.
- Academic advisors in N-181 ESC will help you understand course sequencing and help you plan classes to efficiently fill requirements. They can also help you with study skills and initial career exploration as well as connecting you with correct resources.
- Plan and register from your plan on MyMAP. Your academic advisor can help you understand how to best utilize this resource.
- Evaluate your current program. Periodically major programs are updated. An academic advisor would be happy to review the differences between the programs with you to help you determine what would be best for you.
- Consider meeting with a faculty advisor in your department. Contact info is found on first page of this packet.

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## Tutoring Resources and Research

- Volunteer peer tutors are available through Y Serve if you need help with a class. Also, if you excel in a subject, consider serving your fellow students by becoming a tutor. Find out more here: <https://tutoring.byu.edu/>.
- Many departments provide TA Tutorial Labs and research opportunities. Check your department for details:
  - Chemistry and Biochemistry: C-100 BNSN, 801-422-3667, <https://www.chem.byu.edu/>
  - Computer Science: 3361 TMCB, 801-422-3027, [csoffice@cs.byu.edu](mailto:csoffice@cs.byu.edu)
  - Geological Sciences: S-389 ESC, 801-422-3918, [geology@byu.edu](mailto:geology@byu.edu)
  - Mathematics: 275 TMCB, 801-422-2061, [office@mathematics.byu.edu](mailto:office@mathematics.byu.edu)
  - Mathematics Education: 167 TMCB, 801-422-1735, [office@mathed.byu.edu](mailto:office@mathed.byu.edu)
  - Physics and Astronomy: N-283 ESC, 801-422-4361, [physics\\_office@byu.edu](mailto:physics_office@byu.edu)
  - Statistics: 2152 WVB, 801-422-4505, [statsec@stat.byu.edu](mailto:statsec@stat.byu.edu)

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## Prepare Early for a Career

- Check out University Career Services in 2590 WSC and at <https://ucs.byu.edu/>.
- Consider doing an internship.
  - Attend the STEM and Career Fairs held in fall and winter semesters.
  - Talk to your department about internship opportunities.
  - Use LinkedIn and Handshake (see flyer in this packet) to connect with alumni and apply for jobs/internships. BYU Connect is another great resource for networking ([connect.byu.edu](http://connect.byu.edu)).
  - Talk with the college Career Director who can help you search for internships as well as assist you with many other career related strategies (see first page of this packet).
- Consider taking StDev 317 (Career Strategies) your junior year.
- Consider taking either Chem 502, CS 502, Geol 502, Math 502, PHSCS 502, or STAT 502 (1-credit Job Search Class). Class is held for 1 hour per week for eight non-consecutive weeks throughout the semester.

# BS in Physics and Astronomy (694832) MAP Sheet

Physical and Mathematical Sciences, Physics and Astronomy

For students entering the degree program during the 2022-2023 curricular year.



University Core and Graduation Requirements	Suggested Sequence of Courses	
<b>University Core Requirements:</b>		
<b>Requirements</b>	<b>#Classes</b>	<b>Hours</b>
<b>Religion Cornerstones</b>		<b>Classes</b>
Teachings and Doctrine of The Book of Mormon	1	2.0 REL A 275
Jesus Christ and the Everlasting Gospel	1	2.0 REL A 250
Foundations of the Restoration	1	2.0 REL C 225
The Eternal Family	1	2.0 REL C 200
<b>The Individual and Society</b>		
American Heritage	1-2	3-6.0 from approved list
Global and Cultural Awareness	1	3.0 from approved list
<b>Skills</b>		
First Year Writing	1	3.0 from approved list
Advanced Written and Oral Communications	1	3.0 PHSCS 416 or WRTG 316
Quantitative Reasoning	1	4.0 MATH 113*
Languages of Learning (Math or Language)	1	4.0 MATH 113*
<b>Arts, Letters, and Sciences</b>		
Civilization 1	1	3.0 from approved list
Civilization 2	1	3.0 from approved list
Arts	1	3.0 from approved list
Letters	1	3.0 from approved list
Biological Science	1	3-4.0 from approved list
Physical Science	1	3.0 PHSCS 222*
Social Science	1	3.0 from approved list
<b>Core Enrichment: Electives</b>		
Religion Electives	3-4	6.0 from approved list
Open Electives	Variable	Variable personal choice
*THESE CLASSES FILL BOTH UNIVERSITY CORE AND PROGRAM REQUIREMENTS (7 hours overlap)		
<b>Graduation Requirements:</b>		
Minimum residence hours required		30.0
Minimum hours needed to graduate		120.0
<b>FRESHMAN YEAR</b>		
<b>1st Semester</b>		
PHSCS 121 (FWSp)	3.0	
PHSCS 127 (FWSp)	3.0	
PHSCS 191 (F)	0.5	
MATH 112 (FWSpSu)	4.0	
First-year Writing	3.0	
Religion Cornerstone course	2.0	
<b>Total Hours</b>	<b>15.5</b>	
<b>2nd Semester</b>		
PHSCS 123 (FWSp)	3.0	
MATH 113 (FWSpSu)	4.0	
C S 111	3.0	
American Heritage	3.0	
Religion Cornerstone course	2.0	
<b>Total Hours</b>	<b>15.0</b>	
<b>SOPHOMORE YEAR</b>		
<b>3rd Semester</b>		
PHSCS 220 (FWSp)	3.0	
PHSCS 227 (F)	3.0	
PHSCS 230 (FW)	1.0	
PHSCS 291 (F)	0.5	
MATH 302 (FW)	4.0	
General Electives	2.0	
Religion Cornerstone course	2.0	
<b>Total Hours</b>	<b>15.5</b>	
The MATH 213/215/314/334 (9 cr) sequence can be taken in place of the MATH 302/303 (8 cr) sequence.		
<b>4th Semester</b>		
PHSCS 222 (FW)	3.0	
PHSCS 228 (W)	3.0	
MATH 303 (FW)	4.0	
Biological Science	3.0	
Religion Cornerstone course	2.0	
<b>Total Hours</b>	<b>15.0</b>	
<b>JUNIOR YEAR</b>		
<b>5th Semester</b>		
PHSCS 318 (FW)	3.0	
PHSCS 321 (FSp)	3.0	
PHSCS 330 (FSp)	1.0	
Civilization 1	3.0	
Social Science	3.0	
Religion Elective	2.0	
<b>Total Hours</b>	<b>15.0</b>	
<b>6th Semester</b>		
PHSCS 329 (FW)	3.0	
PHSCS 360 (W) or 471 (WSu) (requirement 2)	3.0	
Arts	3.0	
Civilization 2	3.0	
General Elective	4.0	
Religion Elective	2.0	
<b>Total Hours</b>	<b>18.0</b>	
<b>SENIOR YEAR</b>		
<b>7th Semester</b>		
PHSCS 427 (F)	3.0	
PHSCS 441 (FSp)	3.0	
PHSCS 451 (F)	3.0	
Letters	3.0	
Religion Elective	2.0	
<b>Total Hours</b>	<b>14.0</b>	
<b>8th Semester</b>		
PHSCS 416 (W)	3.0	
PHSCS 428 (W)	3.0	
PHSCS 360 (W) or 442 (W) or 452 (WSu) or 471 (FW) (requirement 2)	3.0	
PHSCS 498R (Senior thesis credit; FWSpSu)	2.0	
Global and Cultural Awareness	3.0	
<b>Total Hours</b>	<b>14.0</b>	
<b>Note:</b> Students are encouraged to complete an average of 15 credit hours each semester or 30 credit hours each year, which could include spring and/or summer terms. Taking fewer credits substantially increases the cost and the number of semesters to graduate.		

**BS in Physics and Astronomy (694832)**  
**2022-2023 Program Requirements (68 - 69 Credit Hours)**

**No more than 3 hours of D credit is allowed in major courses.**

**REQUIREMENT 1** Complete 1 option

**OPTION 1.1** Complete 20 courses

C S 111 - Introduction to Computer Science	3.0
*MATH 113 - Calculus 2	4.0
PHSCS 121 - Introduction to Newtonian Mechanics	3.0
PHSCS 123 - Introduction to Waves, Optics, and Thermodynamics	3.0
PHSCS 127 - Descriptive Astronomy	3.0
PHSCS 191 - Introduction to Physics Careers and Research 1	0.5
PHSCS 220 - Introduction to Electricity and Magnetism	3.0
*PHSCS 222 - Modern Physics	3.0
PHSCS 227 - Solar System Astronomy	3.0
PHSCS 228 - Stellar and Extragalactic Astronomy	3.0
PHSCS 230 - Computational Physics Lab 1	1.0
PHSCS 291 - Introduction to Physics Careers and Research 2	0.5
PHSCS 318 - Introduction to Mathematical Physics	3.0
PHSCS 321 - Mechanics	3.0
PHSCS 329 - Observational Astronomy	3.0
PHSCS 330 - Computational Physics Lab 2	1.0
PHSCS 427 - Stellar Astrophysics	3.0
PHSCS 428 - Galaxies and Cosmology	3.0
PHSCS 441 - Electricity and Magnetism	3.0
PHSCS 451 - Quantum Mechanics	3.0

**Note: Phscs 191 should be taken the first semester as a freshman. Phscs 291 should be taken the first semester as a sophomore.**

**REQUIREMENT 2** Complete 2 courses

PHSCS 360 - Statistical and Thermal Physics	3.0
PHSCS 442 - Electrodynamics	3.0
PHSCS 452 - Applications of Quantum Mechanics	3.0
PHSCS 471 - Principles of Optics	3.0

**REQUIREMENT 3** Complete 1 option

**OPTION 3.1** Complete 2 courses

MATH 302 - Mathematics for Engineering 1	4.0
MATH 303 - Mathematics for Engineering 2	4.0

**OPTION 3.2** Complete 3 courses

MATH 313 - (Not currently offered)	
MATH 314 - Calculus of Several Variables	3.0
MATH 334 - Ordinary Differential Equations	3.0

**OPTION 3.3** Complete 4 courses

MATH 213 - Elementary Linear Algebra	2.0
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MATH 215 - Computational Linear Algebra	1.0
MATH 314 - Calculus of Several Variables	3.0
MATH 334 - Ordinary Differential Equations	3.0

**REQUIREMENT 4** Complete 1 option

**SENIOR THESIS:**

**Complete a senior thesis, including the following:**

**A. Choose a research mentor and group as early as possible, starting with information in Phscs 191 and 192, and discussions with faculty, your advisor, and the senior thesis coordinator. It is best to start as a freshman or sophomore. Some internships may qualify for your project.**

**OPTION 4.1** Complete 2.0 hours from the following course(s)

<b>B.</b>	
PHSCS 498R - Senior Thesis	2.0v
<i>You may take up to 2 credit hours.</i>	

**REQUIREMENT 5**

Students are required to take the Physics "Major Field Test" the last semester before they graduate. The test is a standardized assessment of undergraduate physics written by ETS (Educational Testing Service). The ETS website contains a description of the exam and sample problems: <http://www.ets.org/mft/about/content/physics>. Results of the exam do not appear on the transcript or affect the GPA. Students should contact the Physics undergraduate secretary to make arrangements for taking the exam; typically it's done in the Testing Center before mid-semester.

**Note: Students planning on graduate school in astronomy should consider taking all four of Phscs 360, 442, 452, 471, instead of only two. Gain statistics and computer programming skills beyond what you get in this major by taking courses such as Stat 201 (Statistics for Engineers and Scientists) and courses such as Phscs 430 (Computational Physics 3) and Me En 373 (Introduction to Scientific Computing).**

**THE DISCIPLINE:**

Over the centuries physicists and astronomers have studied the fundamental principles that govern the structure and dynamics of matter and energy in the physical world, from subatomic particles to the cosmos. Physicists also apply this understanding to the development of new technologies. For example, physicists invented the first lasers and semiconductor electronic devices.

Physics and astronomy students learn to approach complex problems in science and technology from a broad background in mechanics, electricity and magnetism, statistical and thermal physics, quantum mechanics, relativity, and optics. The tools they develop at BYU include problem solving by mathematical and computational modeling, as well as experimental discovery and analysis. All students gain professional experience in a research, capstone, or internship project, usually in close association with faculty. Together these experiences can provide excellent preparation for employment or for graduate studies in physics, other sciences, engineering, medicine, law, or business.

Most physicists and astronomers work in research and development in industrial, government, or university labs to solve new problems in technology and science. They also share the beauty discovered in our physical universe by teaching in high schools, colleges, and universities.

**CAREER OPPORTUNITIES:**

A degree in physics or physics-astronomy can provide:

1. Preparation for those who intend to enter industrial or governmental service as physicists or astronomers.
2. Education for those who intend to pursue graduate work in physics or astronomy.
3. Education in the subject matter of physics for prospective teachers of the physical sciences.
4. Undergraduate education for those who will pursue graduate work in the professions: business (e.g., an MBA), law, medicine, etc.
5. Fundamental background for other physical sciences and engineering, in preparation for graduate study in these fields.
6. Physics fundamentals required by the biological science, medical, dental, nursing, and related programs.

For more information, see [www.physics.byu.edu/undergraduate/careers](http://www.physics.byu.edu/undergraduate/careers).

## **BS in Physics and Astronomy (694832)**

**2022-2023**

### **MAP DISCLAIMER**

While every reasonable effort is made to ensure accuracy, there are some student populations that could have exceptions to listed requirements. Please refer to the university catalog and your college advisement center/department for complete guidelines.

### **DEPARTMENT INFORMATION**

FACULTY ADVISORS ASSIGNED BY LAST TWO DIGITS OF BYU ID NUMBER. CONTACT:

#### **Department of Physics and Astronomy**

Brigham Young University  
N-283 ESC  
Provo, UT 84602  
Telephone: (801) 422-4361

### **ADVISEMENT CENTER INFORMATION**

#### **Physical and Mathematical Sciences College Advisement Center**

Brigham Young University  
N-181 ESC  
Provo, UT 84602  
Telephone: (801) 422-2674

# BYU

## Physics and Astronomy BS

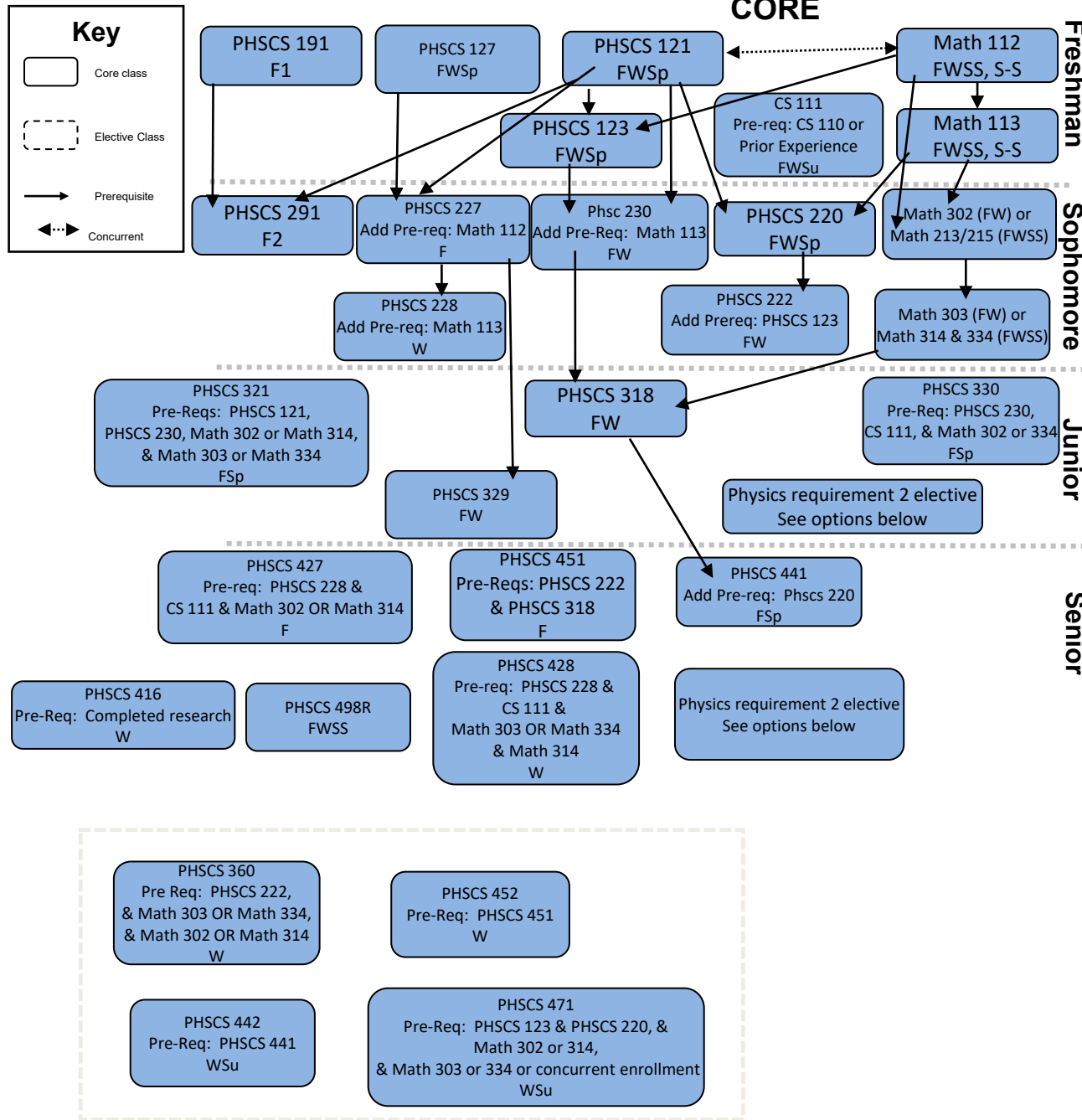
Requirements / Prerequisites  
2022-203 Academic Year

### Major (68-69 Hours)

- No more than 3 Hours of D credit is allowed in major courses.
- Complete the following courses: CS 111, Math 113, PHSCS 121, PHSCS 123, PHSCS 127, PHSCS 191, PHSCS 220, PHSCS 222, PHSCS 227, PHSCS 228, PHSCS 230, PHSCS 291, PHSCS 318, PHSCS 321, PHSCS 329, PHSCS 330, PHSCS 427, PHSCS 428, PHSCS 441, PHSCS 451.
- Complete two courses of the following: PHSCS 360, PHSCS 442, PHSCS 452, PHSCS 471.
- Complete one of the following math options: Take either Math 302 and Math 303 OR Math 213, Math 215, Math 314, and Math 334.
- Complete two credits from PHSCS 498R.
- Take the Physics Major Field Test your last semester.

### Astronomy Minor

Complete the following 6 courses: Math 113, PHSCS 121, PHSCS 127, PHSCS 227, PHSCS 228, PHSCS 329



## handshake

BYU's own job board. Employers who want to hire BYU graduates or offer internships to current students post job openings to this website and students apply. Just like LinkedIn, employers can view student profiles and students can network as they apply for jobs and internships

**Login to [handshake.byu.edu](https://handshake.byu.edu) >>> BYU Net ID**

*\*you do not need to create an account, just sign in with you BYU information*



## HOW TO MAKE THE MOST OUT OF HANDSHAKE:

### 1. COMPLETE YOUR PROFILE

- Upload your resume and it will auto-fill in your profile
- Completed profiles tailor your Handshake experience
- Information from your transcript is already uploaded
- Fill in the Summary/Bio section
- Fill in your past jobs and experiences, including all the bullet points you use on your resume
- Add a professional headshot and background photo

Remember: every word in your profile will be searchable by students and employers

### 4. EXPLORE FELLOW STUDENTS

- “Students” tab
- Search for fellow BYU students to view their profiles and job positions (Facebook stalking... “networking”)

### 5. ATTEND EVENTS

- The “Events” tab will be your key to attending info sessions, interviews, and Career Fairs
- The “Calendar” tab under “Events” will show you what events are coming soon
- Make sure to save events you are interested in or RSVP so you do not forget to attend
- Spread the word to your friends on social media

### 6. DOWNLOAD HANDSHAKE APP

- Search: “Handshake” not “Handshake Career Services”
- Input your BYU e-mail address: [netID@byu.edu](mailto:netID@byu.edu) (it will forward emails to the e-mail you have on file with BYU)
- Handshake will send you a link via e-mail to enable your account in the app
- Navigate the app to perform all the functions of the website that have been previously mentioned

### 7. VISIT THE CAREER STUDIO

- Freshen up your resume, cover letter, or LinkedIn
- Receive networking help
- Practice interviewing with a mock interview
- Meet with a full-time Career Counselor in your field

### 8. GET A JOB, RING THE BELL

- Once you're hired, stop by the Career Studio to ring our Victory Bell and get a picture for the Victory Board



**employers are**  
**5X MORE LIKELY**  
**to view a profile that has**  
**at least one job/skill/organization**

### 2. APPLY FOR JOBS

- Search for job titles, employers, or skills
- Apply for interesting jobs that meet your skill set

### 3. RESEARCH COMPANIES

- Under the “Jobs” Tab there is an “Employers” Tab
- Search for keywords or locations to find companies that are the right fit for you
- Plan to attend their info sessions on BYU Campus, connect with them at Career Fairs, or set up informational interviews to learn more

Remember: when looking at companies or jobs, Handshake will tell you what other BYU students have worked there. Use this resource to network and discover more information!

# Possible Careers with a Physics major

(Not a comprehensive list)

Accelerator operator	Manager, esp. high-tech industry
Acoustician	Materials scientist*
Aerodynamicist*	Mathematician*
Astronomer*	Medical doctor*
Biophysicist*	Medical physicist*
Biotechnologist	Meteorologist
Business administration, esp. high-tech industry	Nanotechnology microscopist
Business, self-employed	National security analyst
Computer scientist (many types: financial software developer, hardware engineer, IT consultant, programmer, software engineer, systems analyst, web developer, etc.)	Neurologist*
Dentist*	Nuclear medicine technologist
Engineer (many types: Aerospace, Chemical, Electrical, Electro-optic, Mechanical, Medical device, Nuclear, Optical/laser, Semiconductor device, Manufacturing, Design, Process, Quality Control, Research & Development, Systems, etc.)	Nuclear pharmacist*
Financial analyst	Optical Scientist*
Geophysicist*	Patent agent or lawyer*
Hazardous waste management specialist	Physicist* (many types: Astrophysics, Atomic & Molecular, Biological, Condensed Matter, Nuclear, Optical & Photonic, Particle, Plasma & Fusion, etc.)
Health physicist*	Professor* (university, college, community college)
Lawyer (esp. patents)*	Research lab assistant, research technician
	Sales, esp. high-tech industry
	Space scientist
	Scientific computer programmer
	Teacher (high school physics, high school science, middle school science)

\*Usually requires a graduate degree

*Gathered from the Counseling and Career Center and from the American Institute of Physics (aip.org)*



## Research Groups

<b>Group</b>	<b>Day</b>	<b>Time</b>	<b>Location</b>
<a href="#">Acoustics</a>	Thursday	4:00PM	C255 ESC
<a href="#">Astronomy</a>	Every other Thursday	12:00PM	MARB 108
<a href="#">Atomic, Molecular, Optical Condensed Matter Materials for Space Observatories</a>	Contact individual professors		
<a href="#">Quantum</a>	Wednesday	4:00PM	N288 ESC
<a href="#">Science Education</a>	Wednesday	4:00PM	N209 ESC
<a href="#">Theoretical and Mathematical</a>	Thursday	2:00PM	N309 ESC
	Wednesday	3:00PM	N106 ESC
	Tuesday	3:00PM	N209 ESC

\*For most updated information on times and locations of research groups, please visit: <https://www.physics.byu.edu/undergraduate/research> Be sure to scroll down to the professors for additional information.