



## *PikeView High School Physics Info and Q & A*

*Dr. Sean P. McBride, Recruitment Committee Chair for Physics*

*11-14-2022 3:15 pm on Zoom*

*[mcbrides@marshall.edu](mailto:mcbrides@marshall.edu) & 304-696-2758*

[www.marshall.edu/physics](http://www.marshall.edu/physics)

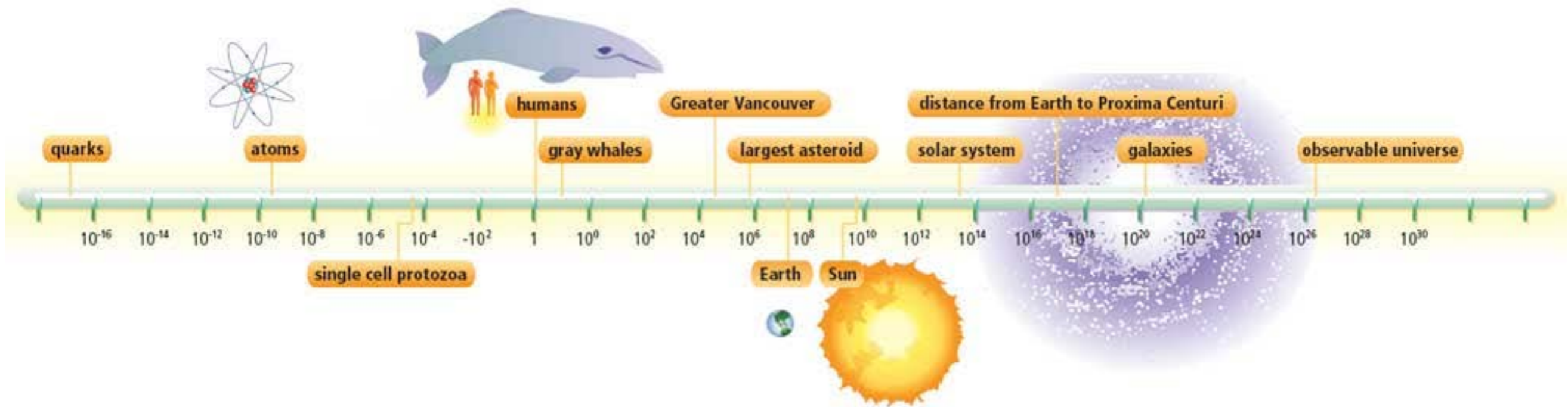
[www.facebook.com/MUPhysicsDept/](https://www.facebook.com/MUPhysicsDept/)



PHYSICS

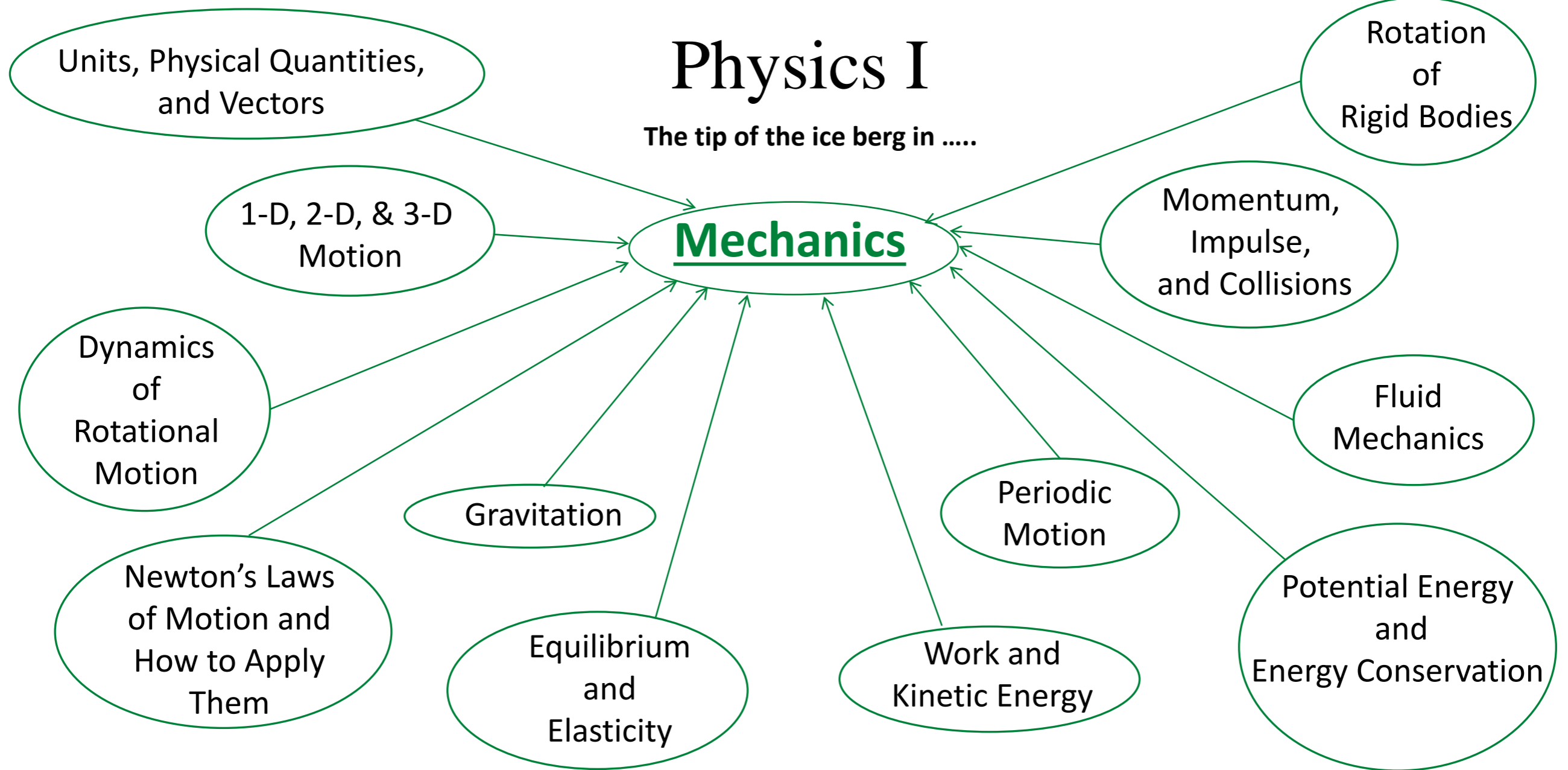


# Physics Applies to All Length Scales!



# Physics I

The tip of the ice berg in .....



## Waves & Acoustics

Mechanical Waves, Periodic Waves, The Wave Equation, Interference, Sound Waves, Sound Intensity,...

# Physics II

The tip of the ice berg in .....

## Electricity

Charges, fields, forces, potentials, current, voltage, power, DC circuits, ....

## Magnetism

Forces, fields in materials, solenoids, current loops, torques, atomic structure, ....

## Electromagnetism

Ampere's Law, Faraday's Law, induction, transformers, motors, generators, resonance, AC circuits, the wave nature of light, ....

## Radiation & Nuclear Physics

Radioactive decay, activity, fission, fusion, ionizing radiation, nuclear energy, Radiation Damage, half-life, ...

## Optics

Concave and convex lenses and mirrors, Reflection, Refraction, Snell's' Law, Ray Tracing, ...

Additional classes cover **Modern Physics, Classical Mechanics, and Quantum Mechanics, etc.**

# Common Job Titles of New Physics Bachelors

## Engineering

Systems Engineer  
Electrical Engineer  
Design Engineer  
Mechanical Engineer  
Project Engineer  
Optical Engineer  
Manufacturing Technician  
Associate Engineer  
Application Engineer  
Development Engineer  
Process Engineer / Technician  
Product Engineer  
Product Manager  
Research Engineer  
Test Engineer  
Technical Services Engineer  
Integration Engineer

## Computer Hardware/Software

Software Engineer / Developer  
Programmer  
Web Developer  
IT Consultant  
Systems Analyst  
Technical Support Staff  
Data Analyst

## Business/Finance

Business Analyst  
Consultant  
Project Manager  
Investment Associate / Trader

## Research and Technical

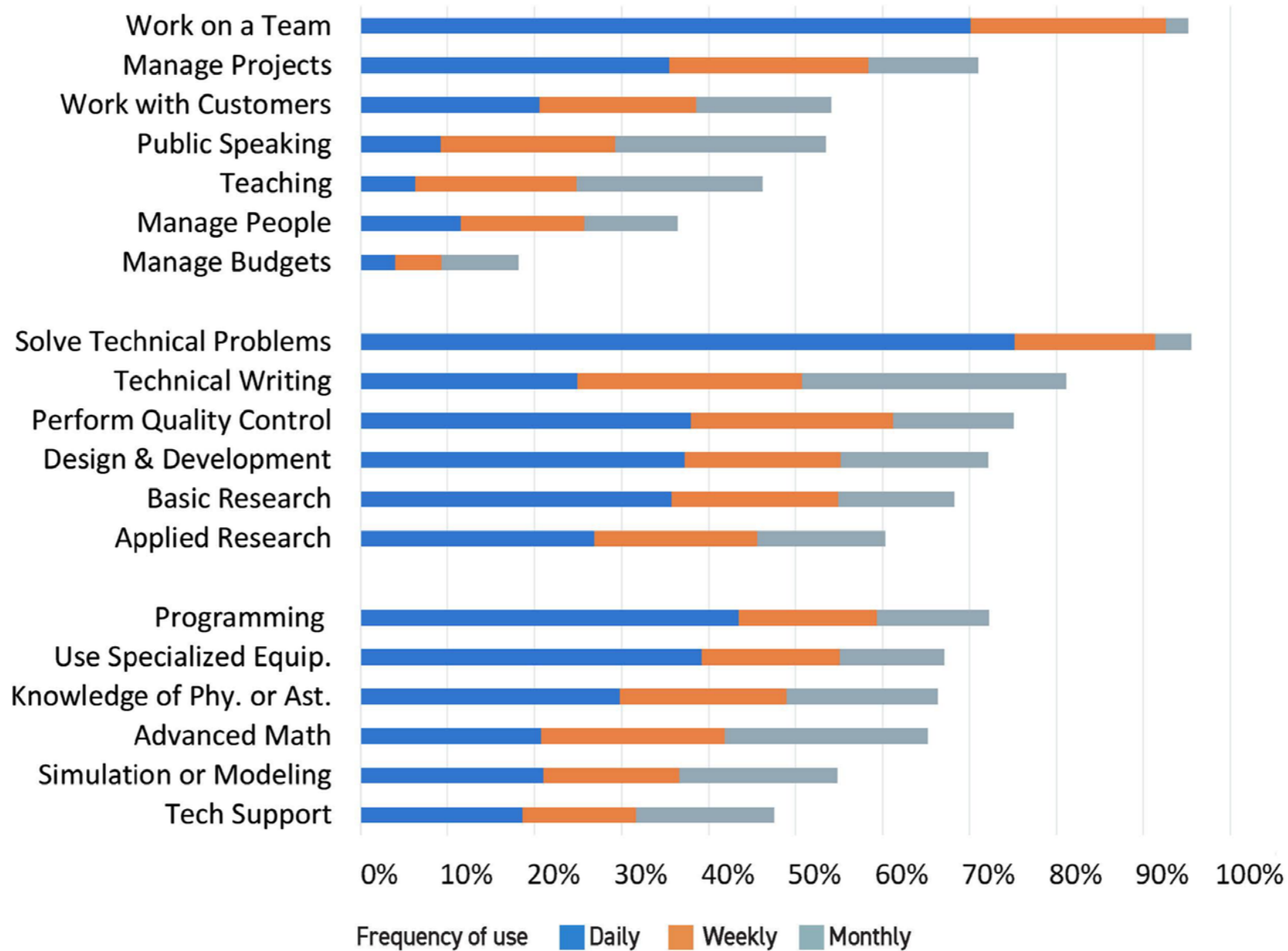
Research Assistant  
Research Associate  
Research Technician  
Lab Technician / Assistant  
Scientist

## Education

High School Physics Teacher  
High School Science Teacher  
Middle School Science Teacher

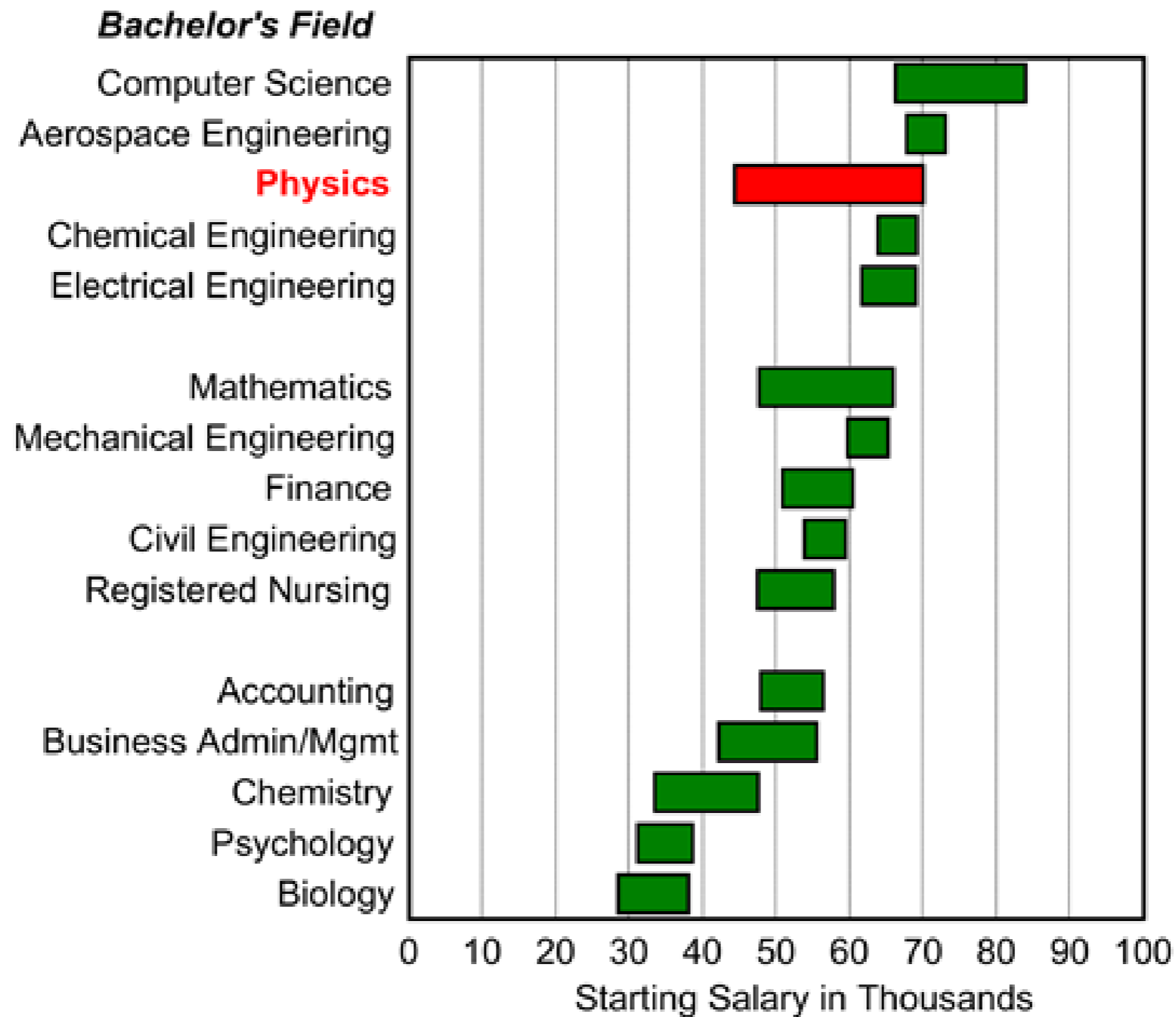
# Knowledge and Skills Used

## New Physics Bachelors Employed in STEM Fields



# What's a Bachelor's Degree Worth?

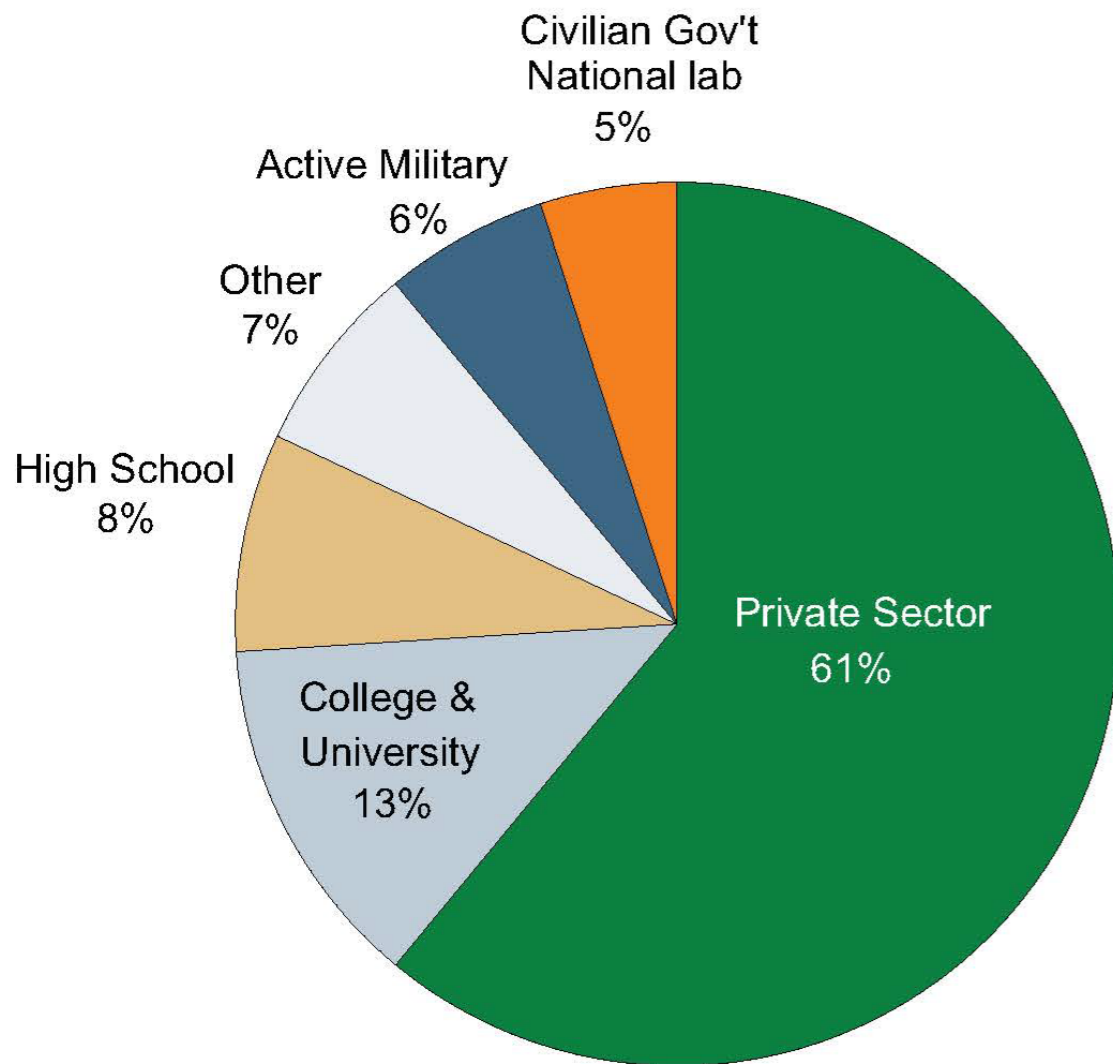
Typical Salaries for Bachelor's Degree Recipients, Class of 2015



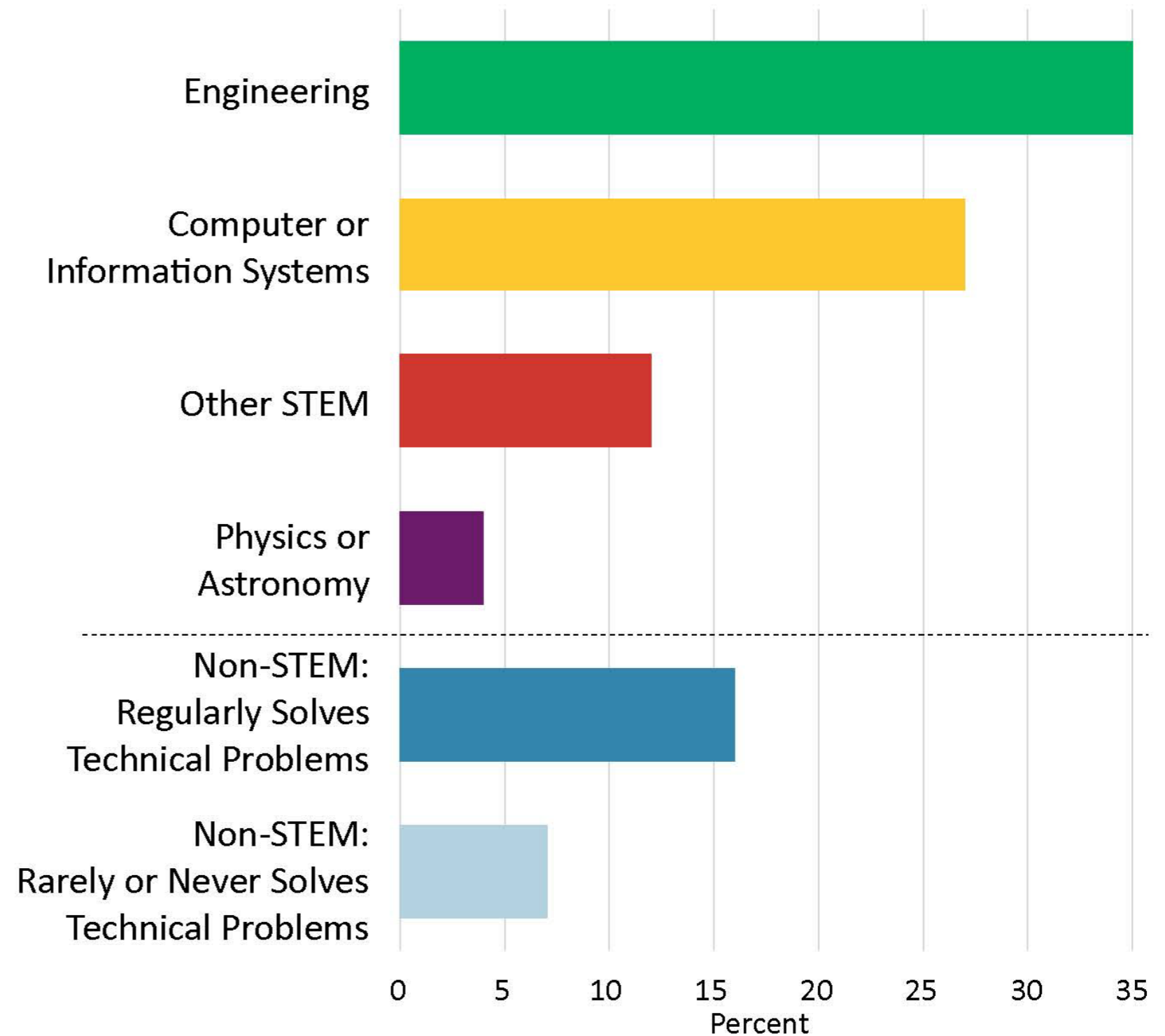
<https://www.aip.org/statistics/physics-trends>

# Field of Employment for New Physics Bachelors

## Employed in the Private Sector



<https://www.aip.org/statistics/physics-trends>





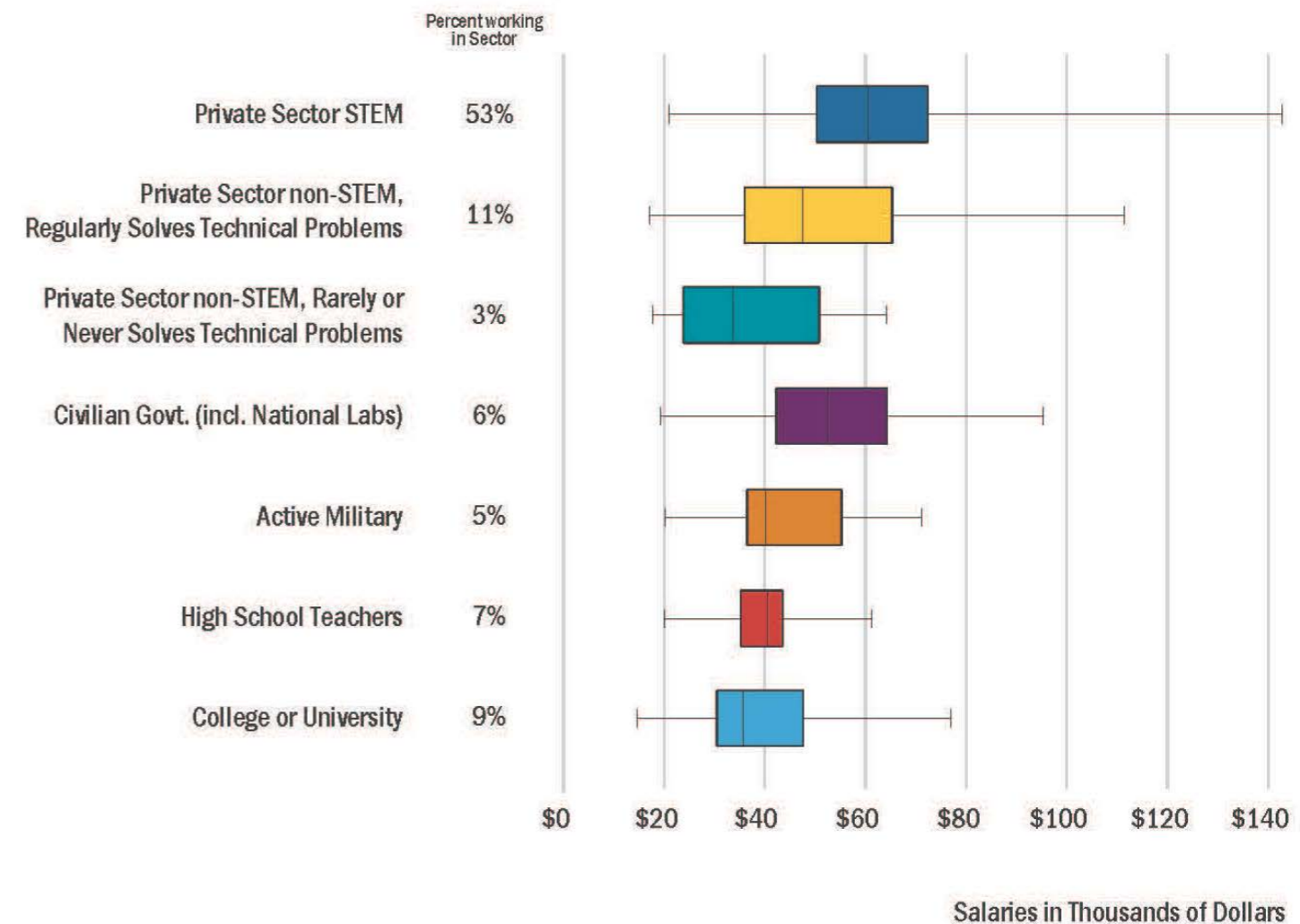
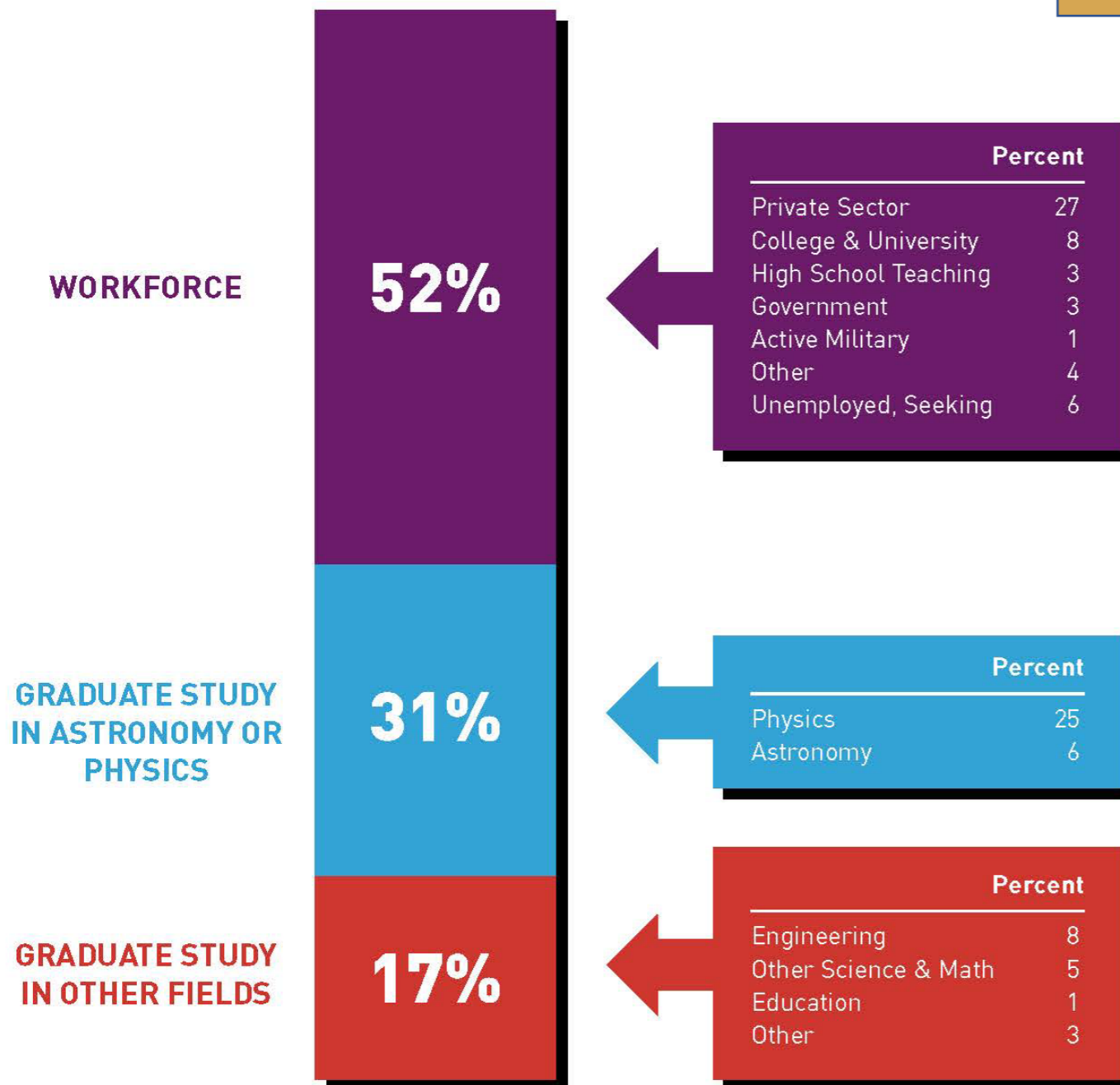
# Physics Bachelors 1 Year Later

9,250 Recent Degree Recipients



# Starting Salaries for Physics Bachelors

Classes of 2017 & 2018



<https://www.aip.org/statistics/physics-trends>

# Graduate School Support

Types of Support and Median Stipends  
for New Physics Bachelors Enrolled in a PhD Program

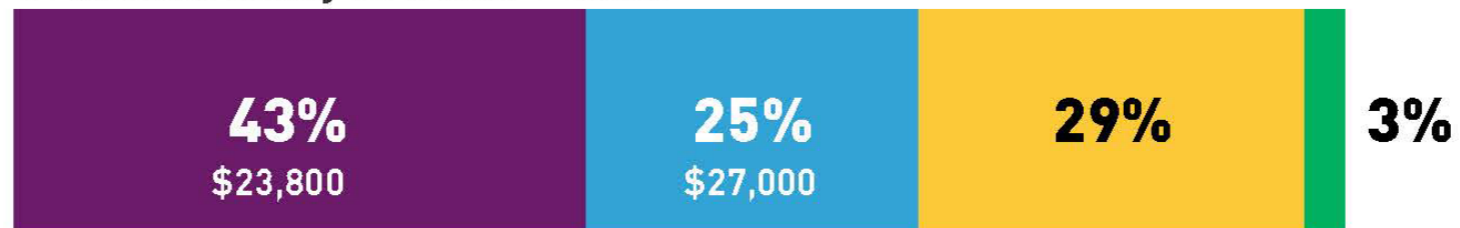
## Graduate Study in Physics and Astronomy



## Graduate Study in Engineering



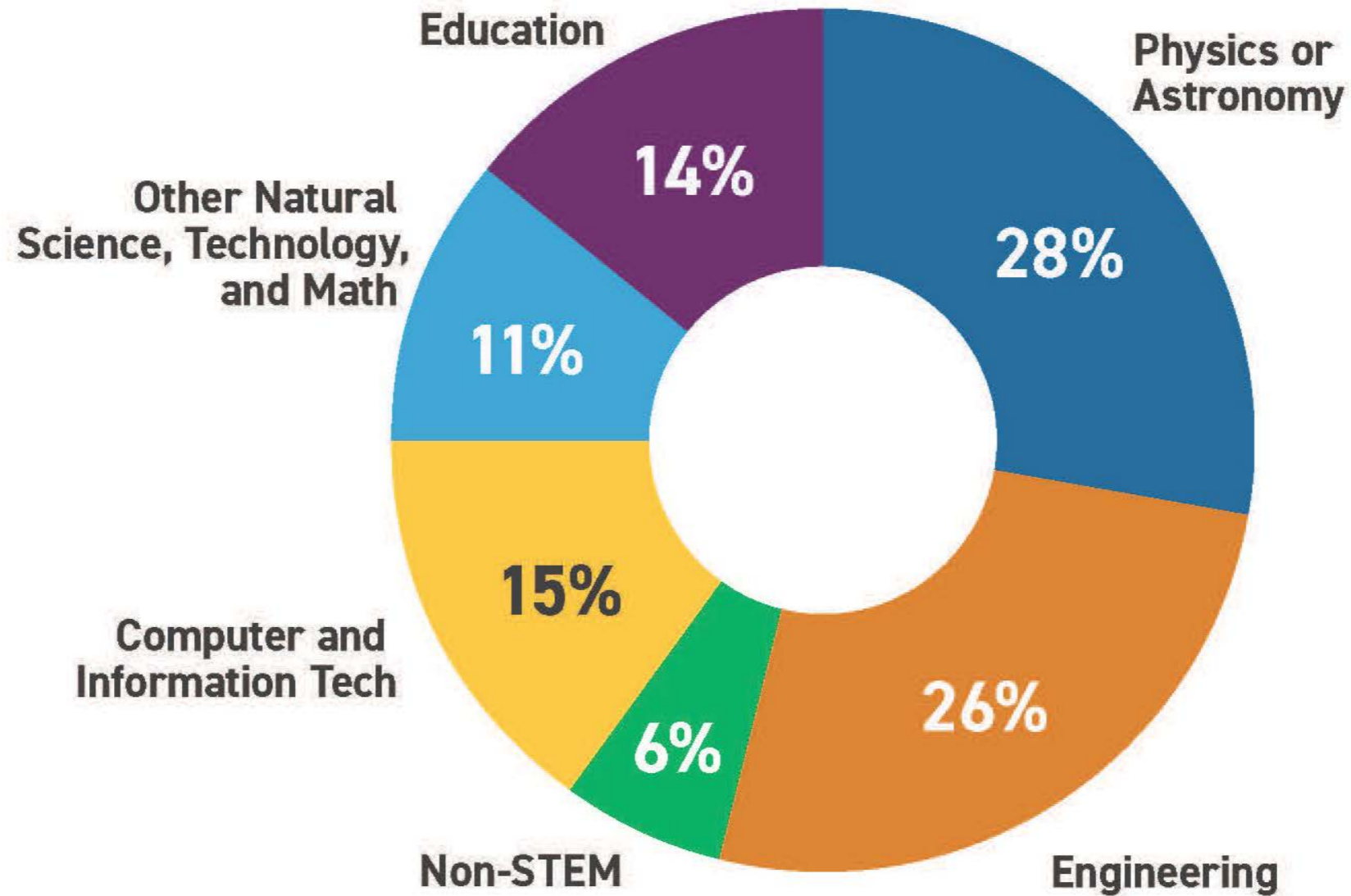
## Graduate Study in Other Fields\*



Teaching Assistant    Research Assistant    Fellowships & Scholarships    Self-funded

<https://www.aip.org/statistics/physics-trends>

# Field of Employment For New Physics Masters One Year After Degree



<https://www.aip.org/statistics/physics-trends>

## Faculty



[Dr. Huong Nguyen](#)  
Physics Chair & Professor  
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Telephone: [304-696-2756](tel:304-696-2756)  
E-mail: [nguyenh@marshall.edu](mailto:nguyenh@marshall.edu)



[Dr. Curtis Foltz](#)  
Assistant Professor  
Location: S 159  
Telephone: [304-696-2519](tel:304-696-2519)  
E-mail: [foltzc@marshall.edu](mailto:foltzc@marshall.edu)  
[Website](#)



[Dr. Maria C. Babiuc Hamilton](#)  
Professor  
Location: S 257  
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E-mail: [babiuc@marshall.edu](mailto:babiuc@marshall.edu)  
[Website](#)



[Dr. Andre Wehner](#)  
Assistant Professor  
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E-mail: [wehnera@marshall.edu](mailto:wehnera@marshall.edu)



[Dr. Xiaojuan Fan](#)  
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[Website](#)



[Dr. Sean McBride](#)  
Assistant Professor  
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[Website](#)



[Dr. Jon Saken](#)  
Associate Professor  
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E-mail: [saken@marshall.edu](mailto:saken@marshall.edu)

**7 Faculty**  
**Fall 2021 to Spring 2022**  
**2 Graduates**

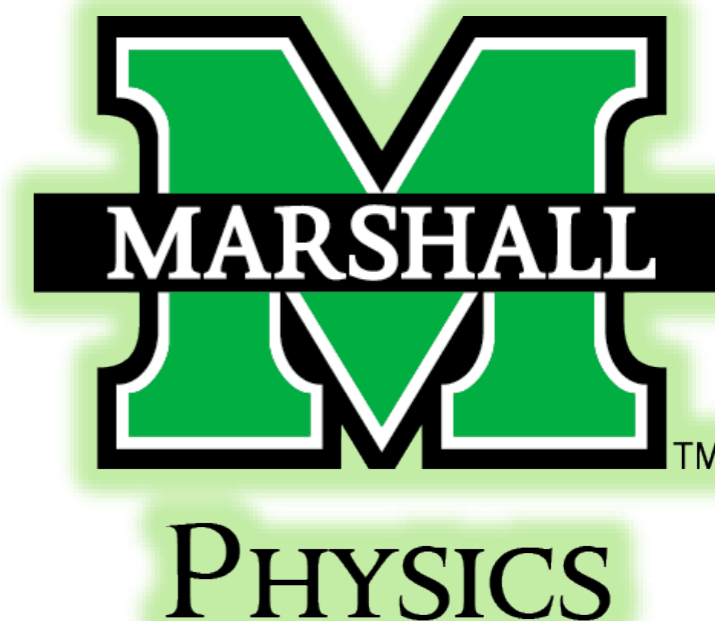
**Fall 2022 ~ 9 Students**  
**2 Seniors**  
**3 Juniors**  
**2 Sophomores**  
**2 Freshmen**

**4 Faculty Perform Onsite Research with Students.**

**Opportunities for students to get hands on experience**

**We Have a Graduate Program in:**

- (1) Physics - 3 students**
- (2) Applied Sciences – 3 students**



### A. Dixon Callihan, Donald C. Martin and Ralph P. Hron Memorial Physics Scholarship

**Eligibility:** Must be a junior or senior physics major with a minimum GPA of 3.00. The award may be received for up to a total of 2 years or four semesters if a 3.0 or better GPA is maintained.

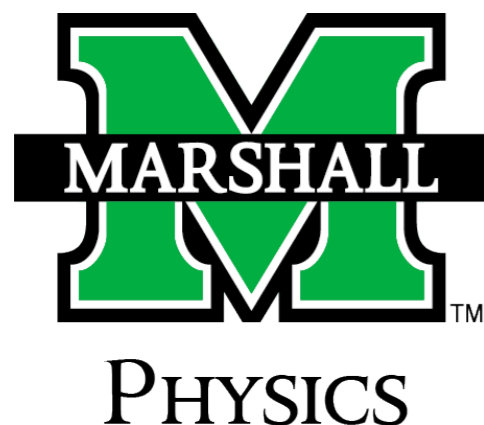
### Alva and Dixon Callihan Scholarship/John Marshall Scholarship

**Eligibility:** High School graduate who has earned a minimum of 3.5 on a 4.0 scale, earned an ACT composite of 26 or higher, and is currently enrolled as a physics major. The scholarship may be kept for successive years under the condition that a 3.25 GPA be maintained. Multiple awards possible and shared between recipients. Reapplication must be made each year.

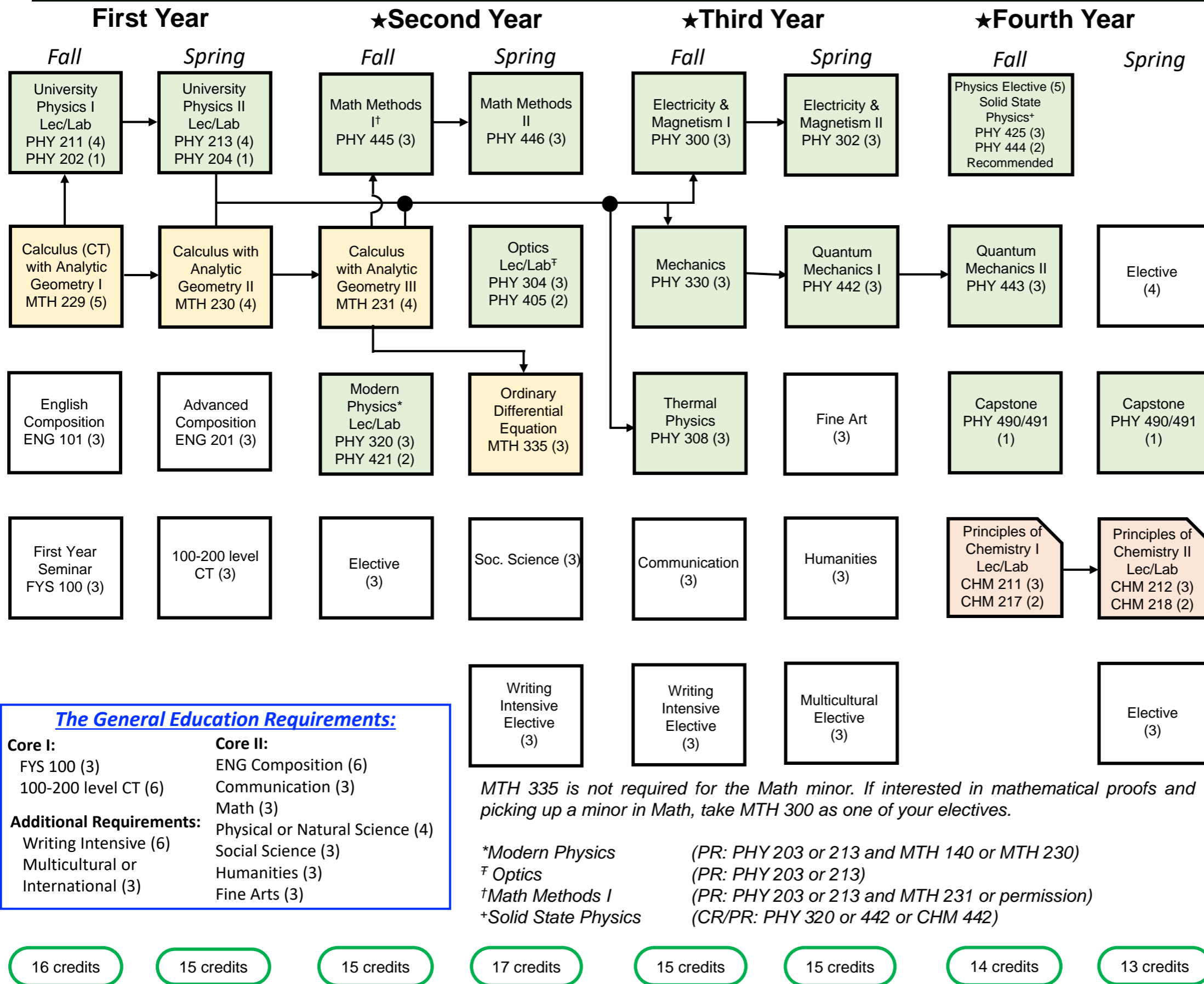
### Dr. Thomas J. and Mary A. Manakkil Memorial Scholarship

**Eligibility:** The recipient shall be a declared physics major actively working toward a degree in the physics program and a full time student at Marshall University with a minimum GPA of 3.00 or better. Academic excellence must be maintained for continued assistance.

Contact: Dr. Huong Nguyen, Physics Department Email: [nguyenh@marshall.edu](mailto:nguyenh@marshall.edu) Phone: (304) 696-2756



# BS in Physics : Sample Curriculum (Revision 3-24-18)



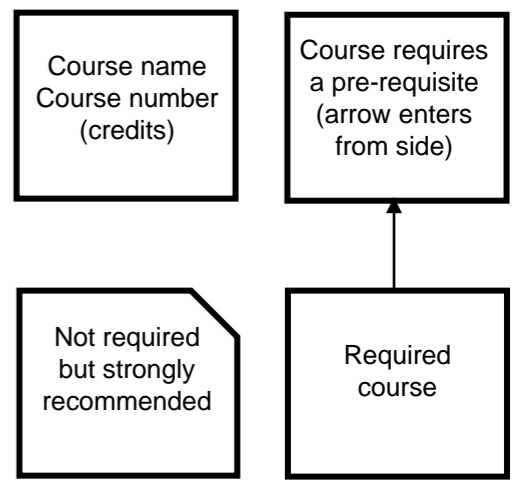
**The General Education Requirements:**

<p><b>Core I:</b> FYS 100 (3) 100-200 level CT (6)</p> <p><b>Additional Requirements:</b> Writing Intensive (6) Multicultural or International (3)</p>	<p><b>Core II:</b> ENG Composition (6) Communication (3) Math (3) Physical or Natural Science (4) Social Science (3) Humanities (3) Fine Arts (3)</p>
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*MTH 335 is not required for the Math minor. If interested in mathematical proofs and picking up a minor in Math, take MTH 300 as one of your electives.*

- \*Modern Physics (PR: PHY 203 or 213 and MTH 140 or MTH 230)
- ‡ Optics (PR: PHY 203 or 213)
- †Math Methods I (PR: PHY 203 or 213 and MTH 231 or permission)
- \*Solid State Physics (CR/PR: PHY 320 or 442 or CHM 442)

- ★ Advanced physics courses are offered every two to three semesters; check with the Physics Department for availability.
- ★ Let Department Chair know if you have an interest in a particular elective course as soon as possible
- This is a sample curriculum only, the order of courses you take could be different depending on your year of entrance.
- All students must take more than 2 credits hours of capstone research

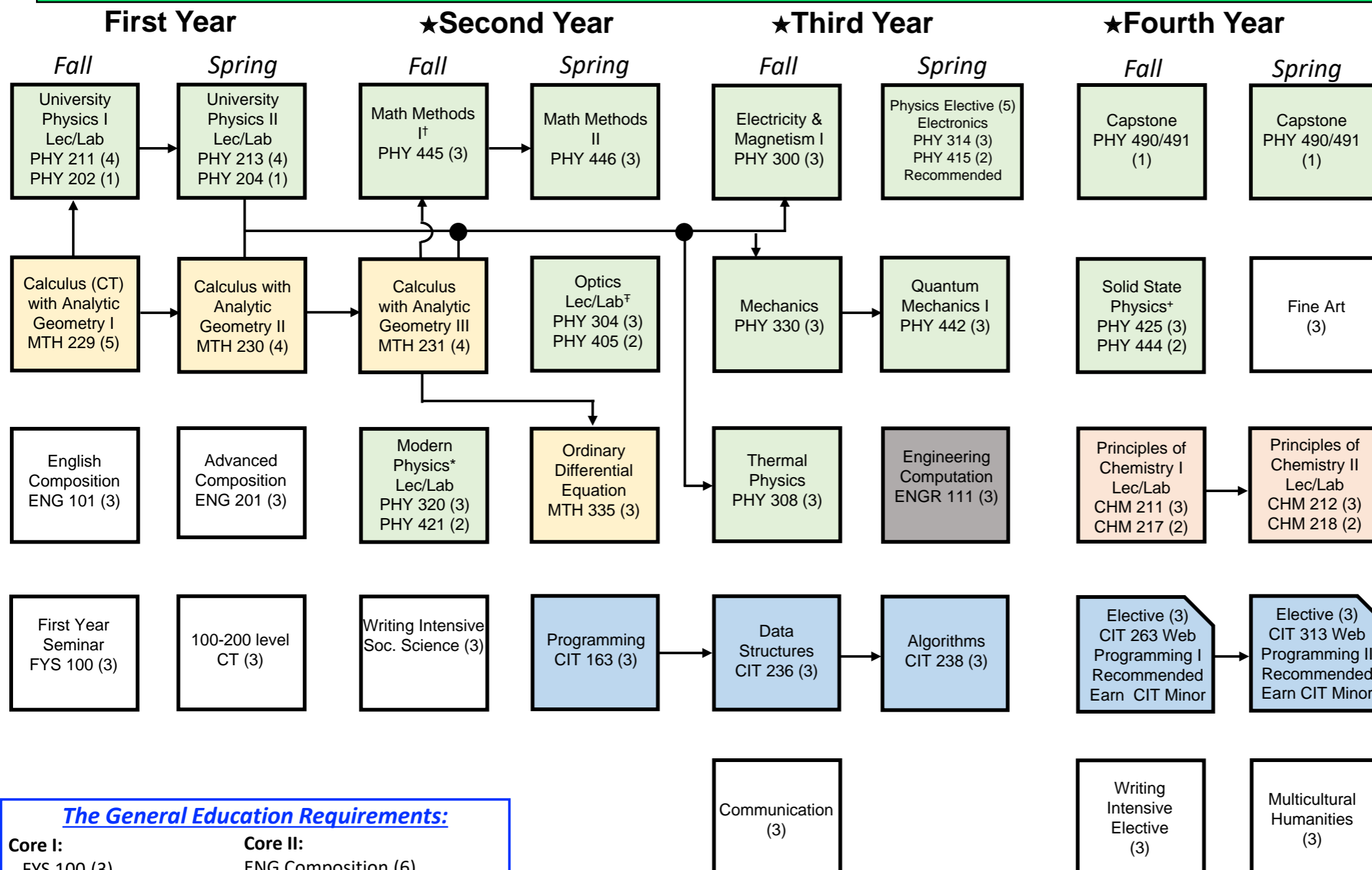


**Total Hours:**  
120

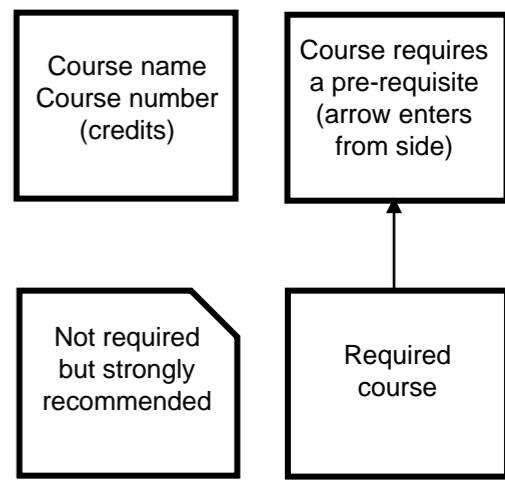
If you have questions or find inconsistencies, please contact Dr. Sean P. McBride  
mcbrides@marshall.edu

16 credits	15 credits	15 credits	17 credits	15 credits	15 credits	14 credits	13 credits
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# BS Physics/Minor CIT : AoE Applied Physics : Sample Curriculum (Revision 3-24-18)



- ★ Advanced physics courses are offered every two to three semesters; check with the Physics Department for availability.
- ★ Let Department Chair know if you have an interest in a particular elective course as soon as possible
- This is a sample curriculum only, the order of courses you take could be different depending on your year of entrance.
- All students must take more than 2 credits hours of capstone research



**The General Education Requirements:**

**Core I:**  
FYS 100 (3)  
100-200 level CT (6)

**Core II:**  
ENG Composition (6)  
Communication (3)  
Math (3)  
Physical or Natural Science (4)  
Social Science (3)  
Humanities (3)  
Fine Arts (3)

**Additional Requirements:**  
Writing Intensive (6)  
Multicultural or International (3)

*If interested in mathematical proofs and picking up a minor in Math, take MTH 300 in addition to the above.*

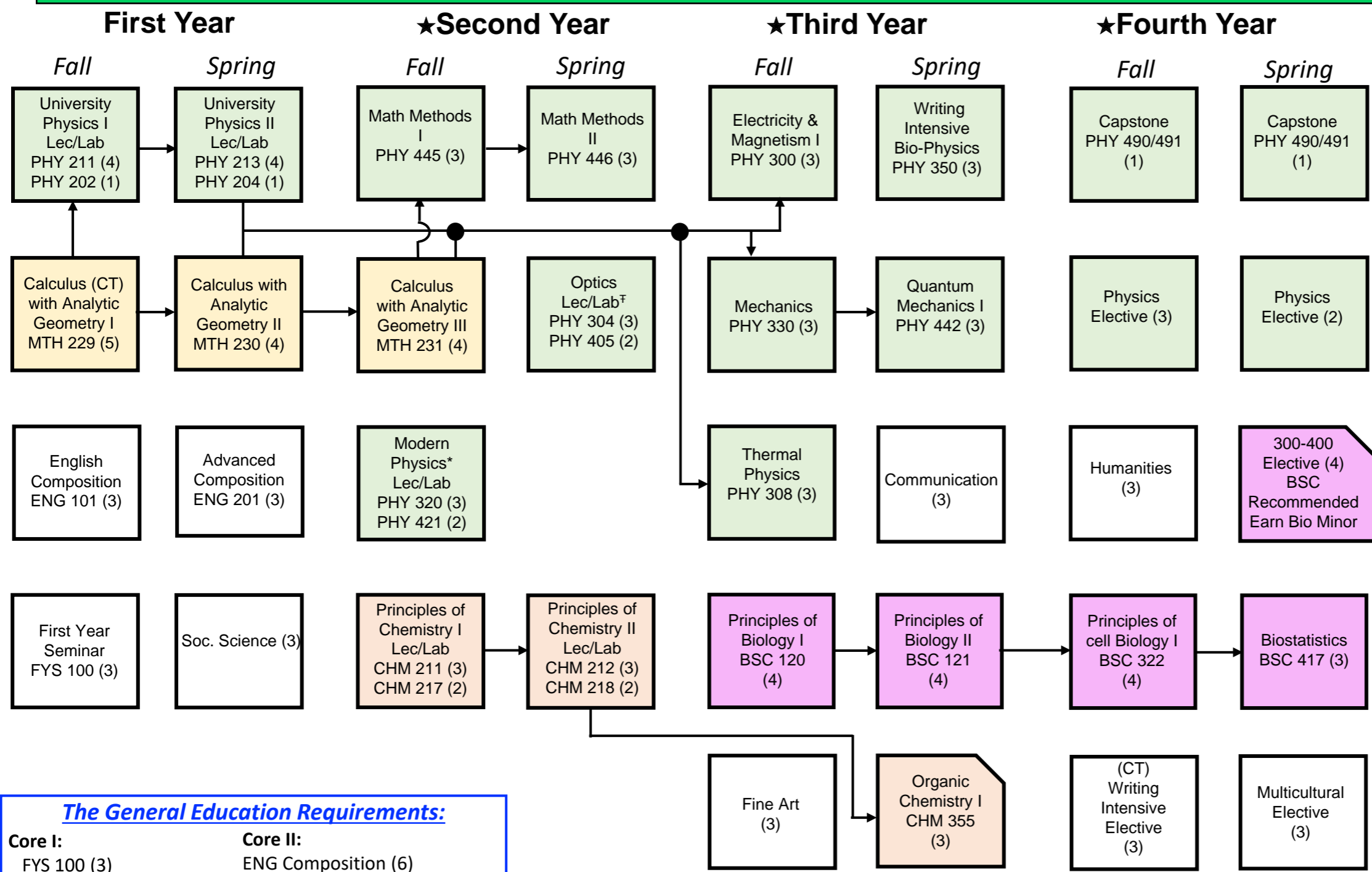
\*Modern Physics (PR: PHY 203 or 213 and MTH 140 or MTH 230)  
 ‡ Optics (PR: PHY 203 or 213)  
 † Math Methods I (PR: PHY 203 or 213 and MTH 231 or permission)  
 + Solid State Physics (CR/PR: PHY 320 or 442 or CHM 442)

Total Hours:  
121

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16 credits
15 credits
15 credits
14 credits
15 credits
14 credits
17 credits
15 credits

# BS Physics/Minor Biology : AoE Bio Physics : Sample Curriculum (Revision 3-24-18)



- ★ Advanced physics courses are offered every two to three semesters; check with the Physics Department for availability.
- ★ Let Department Chair know if you have an interest in a particular elective course as soon as possible
- This is a sample curriculum only, the order of courses you take could be different depending on your year of entrance.
- All students must take more than 2 credits hours of capstone research

**The General Education Requirements:**

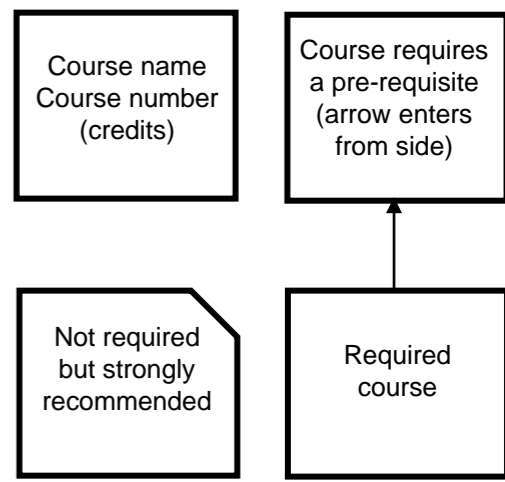
**Core I:**  
 FYS 100 (3)  
 100-200 level CT (6)

**Core II:**  
 ENG Composition (6)  
 Communication (3)  
 Math (3)  
 Physical or Natural Science (4)  
 Social Science (3)  
 Humanities (3)  
 Fine Arts (3)

**Additional Requirements:**  
 Writing Intensive (6)  
 Multicultural or International (3)

*CHM 355 is strongly recommended for BSC 322. BSC 322 is required for the AoE. BSC 417 is strongly recommended for the BSC elective, this requires BSC 322 as a prerequisite. PHY 350 is strongly recommended for the Physics elective. If another 300 level chemistry class is taken as an elective a minor in chemistry can also be earned.*

\*Modern Physics (PR: PHY 203 or 213 and MTH 140 or MTH 230)  
 † Optics (PR: PHY 203 or 213)



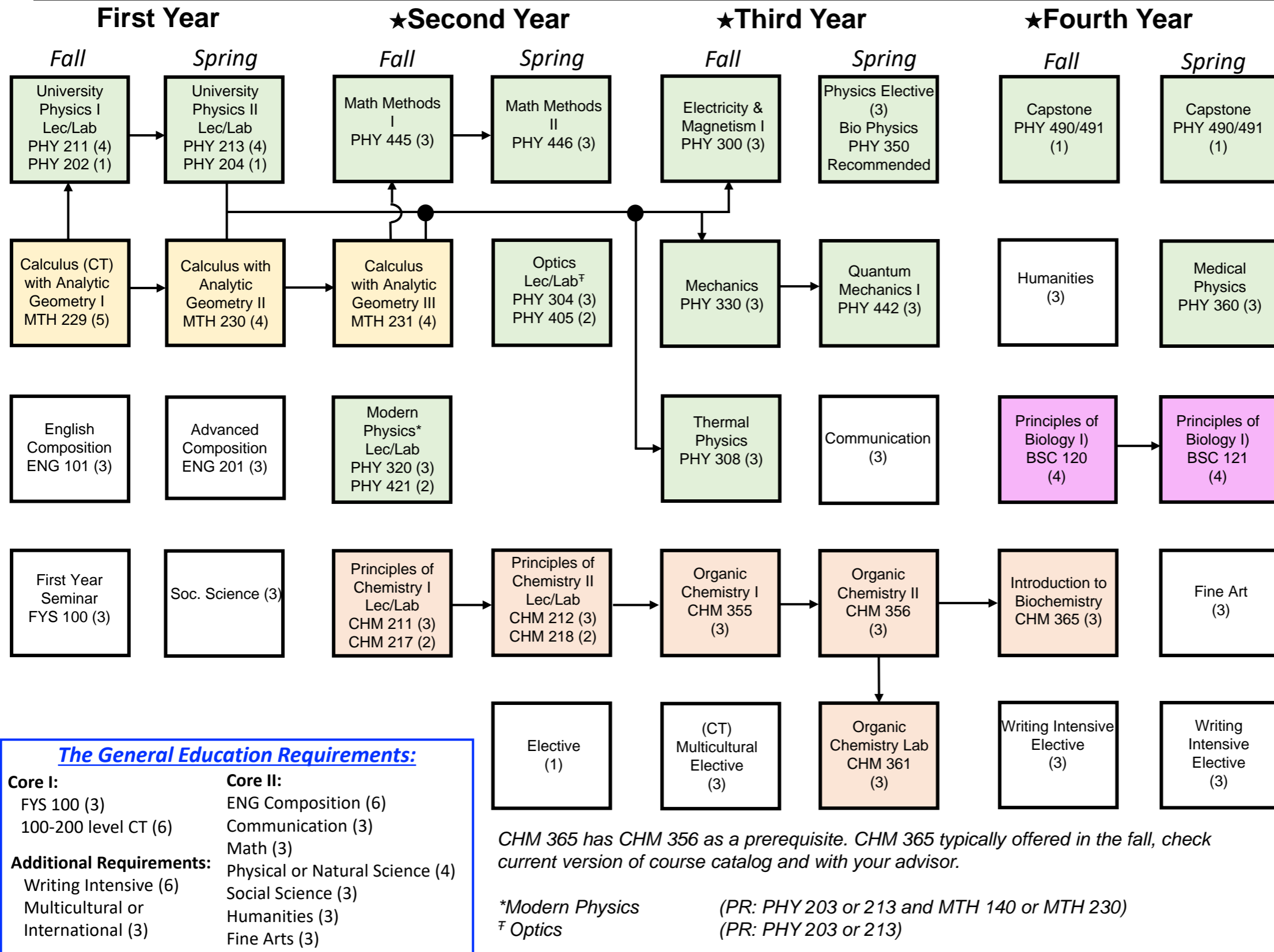
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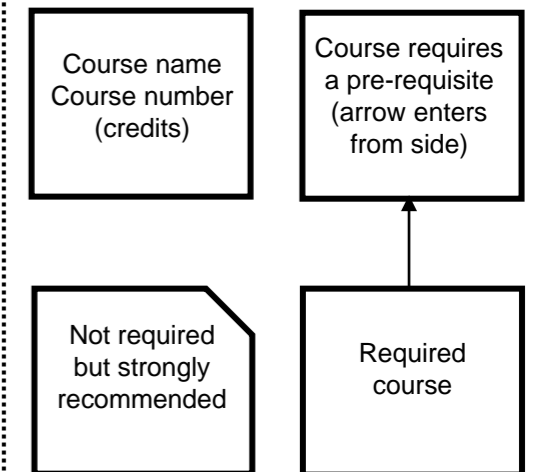
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# BS Physics/Minor Chemistry : AoE Medical Physics : Sample Curriculum (Revision 3-24-18)



- ★ Advanced physics courses are offered every two to three semesters; check with the Physics Department for availability.
- ★ Let Department Chair know if you have an interest in a particular elective course as soon as possible
- This is a sample curriculum only, the order of courses you take could be different depending on your year of entrance.
- All students must take more than 2 credits hours of capstone research



Total Hours:  
120

CHM 365 has CHM 356 as a prerequisite. CHM 365 typically offered in the fall, check current version of course catalog and with your advisor.

\*Modern Physics  
<sup>‡</sup> Optics

(PR: PHY 203 or 213 and MTH 140 or MTH 230)  
(PR: PHY 203 or 213)

If you have questions or find inconsistencies, please contact Dr. Sean P. McBride  
mcbrides@marshall.edu

16 credits    15 credits    17 credits    14 credits    15 credits    15 credits    14 credits    14 credits

# For the Medical Doctors and Lawyers

## MCAT, LSAT and Physics Bachelor's

Average MCAT Scores\* by Selected Majors, 2012

	Physical Science	Biological Science	Verbal Reasoning	Number of Applicants
Economics	10.8	10.8	9.9	633
<b>Physics</b>	<b>11.1</b>	<b>10.4</b>	<b>9.8</b>	<b>228</b>
Biomedical Engineering	11.1	10.6	9.6	1,147
Mathematics	10.6	10.4	9.3	340
Electrical Engineering	10.9	10.1	9.4	135
Neuroscience	10.1	10.6	9.5	1,615
English	9.6	10.1	10.2	380
Biochemistry	10.1	10.4	9.0	2,864
Chemistry	9.5	10.0	9.0	2,113
Microbiology	9.2	10.1	8.8	759
Psychology	9.1	9.6	9.1	2,327
Biology	9.0	9.7	8.7	13,605
Premedical	8.3	8.9	8.1	587
<b>All Majors</b>	<b>9.5</b>	<b>9.9</b>	<b>9.0</b>	<b>44,464</b>

\* Sorted by total score. Based on test takers who applied to Medical School. Applicants are allowed to take the MCAT exam more than once; these averages are computed using each applicant's most recent MCAT exam scores.

Source: Compiled by the Statistical Research Center based on data collected by the Association of American Medical Colleges

<http://www.aip.org/statistics>

*As a group, the physics bachelor's who apply to medical school achieve high scores on the MCAT exam*

*As a group, the physics bachelor's who apply to law school achieve high scores on the LSAT exam.*

Average LSAT Scores\* by Selected Majors, 2012

	Average Score*	Number of Applicants
Mathematics	162.2	254
<b>Physics</b>	<b>162.1</b>	<b>126</b>
Economics	159.1	2,468
Engineering	157.3	1,127
Chemistry	156.7	267
History	156.7	3,323
English	155.8	3,728
Biology	155.2	1,095
Political Science	154.3	12,215
Psychology	153.3	3,335
Computer Science	152.3	327
Pre-Law	149.0	994
Criminal Justice	145.3	2,878
<b>All Majors</b>	<b>153.6</b>	<b>66,197</b>

\* Based on test takers who applied to Law School. Applicants are allowed to take the LSAT exam more than once; these averages are computed using each applicant's highest score on the LSAT exam.

Source: Compiled by the Statistical Research Center based on data collected by the Law School Admission Council

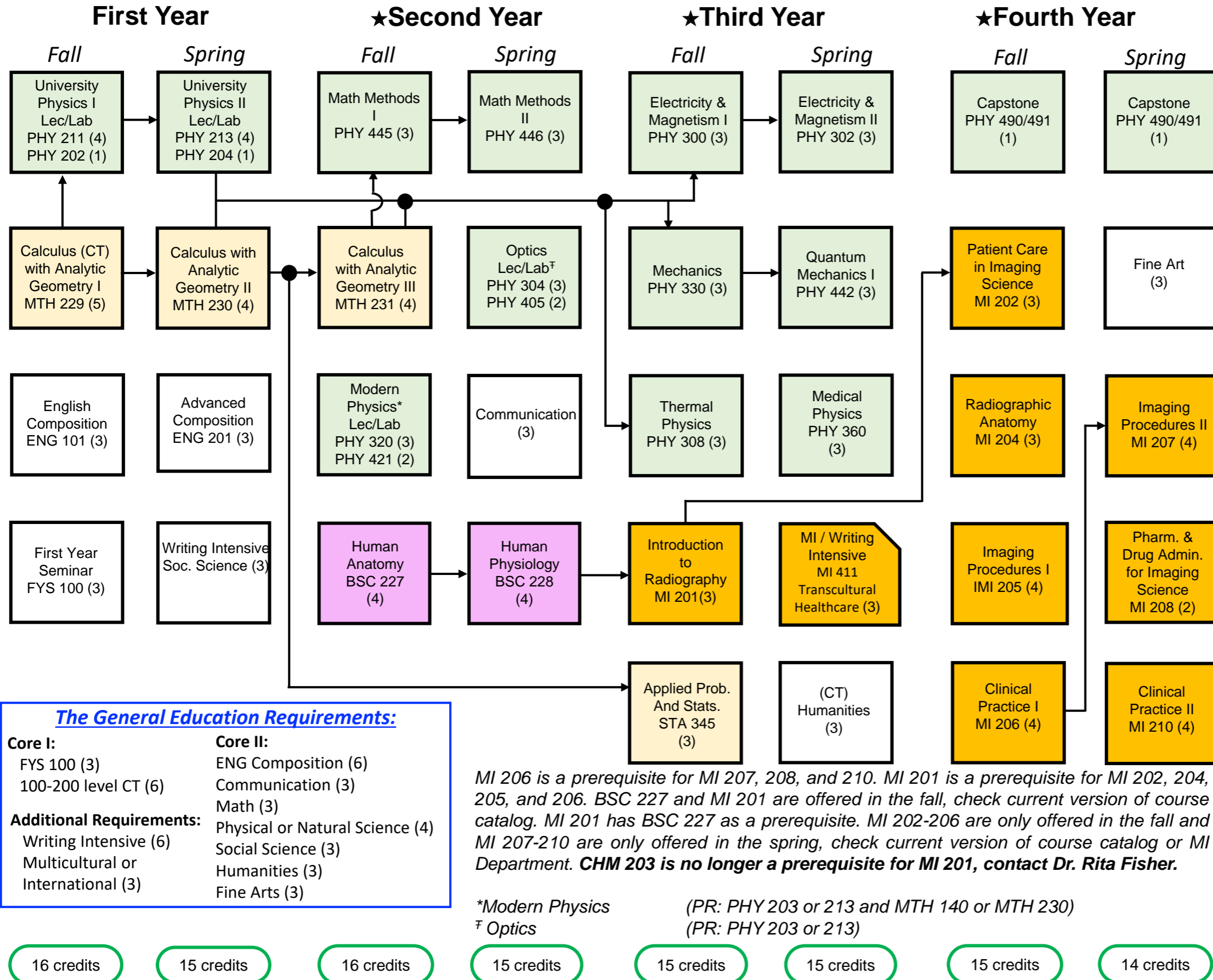
<http://www.aip.org/statistics>

<https://www.aip.org/statistics/physics-trends>

&

<https://www.aip.org/statistics/reports/mcat-lsat-and-physics-bachelors>

# BS Physics : AoE Medical Imaging : Sample Curriculum (Revision 4-14-18)



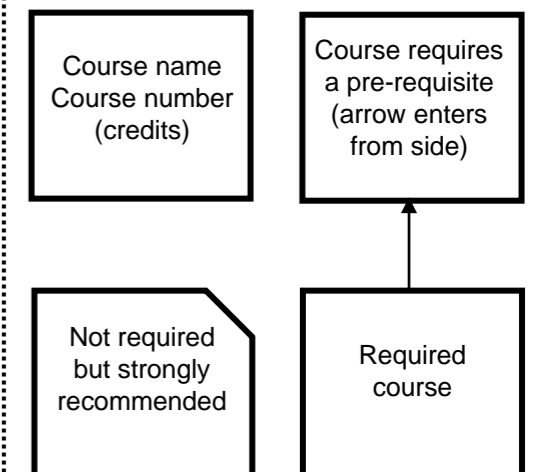
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<b>Additional Requirements:</b> Writing Intensive (6) Multicultural or International (3)	Physical or Natural Science (4) Social Science (3) Humanities (3) Fine Arts (3)

*MI 206 is a prerequisite for MI 207, 208, and 210. MI 201 is a prerequisite for MI 202, 204, 205, and 206. BSC 227 and MI 201 are offered in the fall, check current version of course catalog. MI 201 has BSC 227 as a prerequisite. MI 202-206 are only offered in the fall and MI 207-210 are only offered in the spring, check current version of course catalog or MI Department. **CHM 203 is no longer a prerequisite for MI 201, contact Dr. Rita Fisher.***

\*Modern Physics (PR: PHY 203 or 213 and MTH 140 or MTH 230)  
<sup>‡</sup> Optics (PR: PHY 203 or 213)

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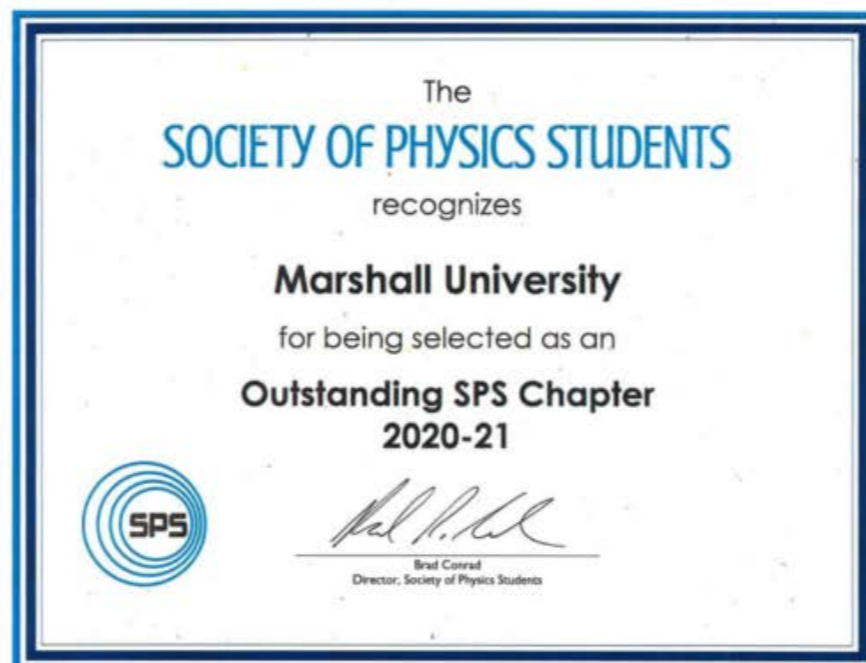
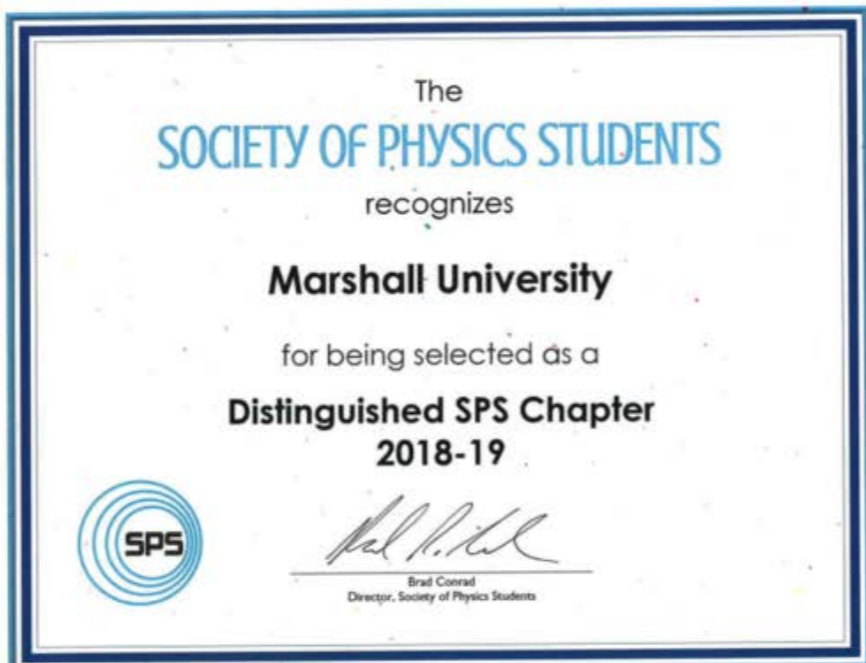
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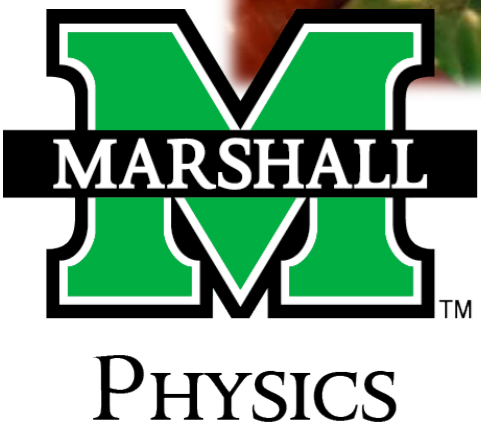
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# SOCIETY OF PHYSICS STUDENTS

An organization of the American Institute of Physics





Thank you for your attention!  
Questions?

