The Department of Physics offers courses in the academic area of Physics (PHYS). In addition, an undergraduate degree is offered, the Bachelor of Science Degree in Physics, as well as a minor in Physics for students pursuing undergraduate degrees in other disciplines. No graduate degrees are offered through this unit at this time. Members of the Department and departmental facilities are housed on the first floor of the Spearman Technology Building with the Department Office located in Room 106.

The primary mission of the Department of Physics is to prepare students majoring and minoring in departmental curricular offerings for entry into the workforce and for graduate study. The mission also embraces making students aware of the natural laws that govern our universe.

Requirements for the Bachelor of Science in Physics are summarized below. Each student must be admitted by the Department, through a departmental admissions procedure, as a major before attempting to meet all of the requirements for either degree. The admissions procedure is under continual review by the Departmental Admissions Committee. Thus, interested students are asked to contact the Department Office during their freshman year for the steps that must be taken in order to gain admission as majors, and to verify application deadlines. Students are responsible for completing ASSET requirements and prerequisites administered through the General University Academic Center (GUAC) prior to admission to the department.

Students pursuing majors or undergraduate degrees in this unit must also have a declared minor in another academic discipline as first-time seekers of an undergraduate degree. The sequence in which major courses must be taken is provided along with degree requirements at the end of this section.

Students must earn grades of “C” or better (where grades of “C-” are unacceptable) in all courses specific to either the major or the minor selected for both degrees offered through this unit. Graduating seniors are also required to take an exit examination.

Students transferring to the University are cautioned that Physics credits transferred from other colleges and universities must be evaluated by the Department before being used to fulfill requirements for the major in Physics. These credits may or may not be acceptable. If these credits are judged to be unacceptable by the Department, students may be able to use them to fulfill core curriculum requirements, elective requirements, or both.

In selecting a minor, as required for completion of the B.S. in Physics, students should seek detailed advisement from their designated advisors because the selection of a minor having representative courses in the core curriculum for the degree sought could impact the total number of credits required. In no case will students qualify for graduation at the undergraduate level with fewer than 124 semester credit hours satisfactorily completed.

For a Physics minor, twenty-one (21) semester credit hours are required through enrollment in the following courses: PHYS 217, PHYS 218, PHYS 251, PHYS 252, and nine (9) additional junior/senior level PHYS credits of choice. Prior to pursuing this minor, students must seek advisement and approval from the Department Office. The prerequisites for PHYS 217 and 251 must also be met before pursuing this minor. Grades of “C” or better must be earned, where grades of “C-” are unacceptable, in these courses.

Students admitted to the Department as majors, as well as students pursuing minors in the unit, are each expected to maintain an overall GPA of 2.50 or better, or they could be dismissed from the Department if more than thirty (30) semester credit hours are still required for graduation. If individual GPA’s fall below 2.50 and students are within thirty (30) semester credit hours of graduation, they will be refused the privilege of recommendations from members of the faculty, but will retain official status in the Department.

Upon admission to the Department, students are each assigned an official advisor. They are expected to keep the Department Office informed of changes in address and/or telephone numbers up to the time of graduation.

In summary, an interested student must first gain admission to the University; must meet his/her ASSET responsibility; must fulfill prerequisites as outlined above; and, finally, must apply for admission to the Department once prerequisites and ASSET requirements have been met. Acceptance to major standing is not automatic, but subject to the decision of a Departmental Admissions Committee. Each student is provided with extensive advisement once admitted to the unit before further progression toward the completion of degree requirements is undertaken, and an exit examination is required. Questions may be directed to the Department Office at (713)-313-1800.
### LISTING OF FACULTY IN THE DEPARTMENT

<table>
<thead>
<tr>
<th>Arya, Sharda</th>
<th>Walker, Erta F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor</td>
<td>Professor</td>
</tr>
<tr>
<td>B.S., M.S., Ph.D., Punjab University</td>
<td>B.S., New Mexico Institute of Mining and Technology</td>
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<td>Ph.D., Stanford University</td>
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<tr>
<th>Chu, Rambis K. H.</th>
<th>Wilkerson, Daryl F.</th>
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<tr>
<td>Associate Professor</td>
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<tr>
<td>B.S., Texas Southern University</td>
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<td>M.S., Ph.D., University of Houston – University Park</td>
<td>Further Study, Texas Southern University</td>
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<th>Handy, Carlos</th>
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<tbody>
<tr>
<td>Professor</td>
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</tr>
<tr>
<td>B.S., M.S., Ph.D., Columbia University</td>
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PHYS 141
Principles of Physical Science
Survey of the physical sciences for the non-scientist, including introductory astronomy, chemistry, and physics. Three hours of lecture, one hour of demonstrations per week.

PHYS 215
Physics Laboratory for Technology and Life Science Students I
Experiments in classical mechanics, vibratory motion, and heat to accompany both Physics 235 and Physics 237. Two hours of laboratory per week. Referred to as General Physics I Laboratory in this document. Corequisites: PHYS 235 or 237. Listed as PHYS 1101 in the Texas Common Course Numbering System.

PHYS 216
Physics Laboratory for Technology and Life Science Students II
Experiments in waves, electricity, magnetism, and optics to accompany both Physics 236 and Physics 238. Two hours of laboratory per week. Referred to as General Physics II Laboratory in this document. Corequisites: PHYS 236 or PHYS 238. Listed as PHYS 1102 in the Texas Common Course Numbering System.

PHYS 217
College Physics Laboratory I
Experiments in classical mechanics, vibratory motion, and heat to accompany Physics 251. Three hours of laboratory per week. Corequisite: PHYS 251.

PHYS 218
College Physics Laboratory II
Experiments in electricity, magnetism, waves, and optics to accompany Physics 252. Three hours of laboratory per week. Corequisite: PHYS 252.

PHYS 235
General Physics for Technology Students I
First part of trigonometry-based introduction to physics for technology students, including classical mechanics, vibratory motion, and heat. Three hours of lecture per week. Corequisite: PHYS 215. Prerequisites: MATH 133 and MATH 134. Listed as PHYS 1301 in the Texas Common Course Numbering System.

PHYS 236
General Physics for Technology Students II
Second part of trigonometry-based introduction to physics for technology students, including waves, electricity, magnetism, optics, and modern physics. Three hours of lecture per week. Corequisite: PHYS 216. Prerequisite: PHYS 235. Listed as PHYS 1302 in the Texas Common Course Numbering System.

PHYS 237
General Physics for Life Science Students I
First part of trigonometry-based introduction to physics for life science students, including classical mechanics, vibratory motion, and heat. Three hours of lecture per week. Referred to as General Physics I in this document. Corequisite: PHYS 215. Prerequisites: MATH 133 and MATH 134.

PHYS 238
General Physics for Life Science Students II
Second part of trigonometry-based introduction to physics for life science students, including waves, electricity, magnetism, optics, and modern physics. Three hours of lecture per week. Referred to as General Physics II in this document. Corequisite: PHYS 216. Prerequisite: PHYS 237 or PHYS 244.

PHYS 244
Physics for Pharmacy Students
One-semester, trigonometry-based introduction to physics for pharmacy majors emphasizing mechanics, heat, thermodynamics, waves, optics, and modern physics. Will not fulfill physics requirements for admission to professional schools or graduation requirements in other majors at Texas Southern University. Four hours of lecture per week. Prerequisites: MATH 133 and MATH 134.
PHYS 251  College Physics I  (5)
First part of calculus-based introduction to physics, including classical mechanics, vibratory motion, waves, and thermodynamics. Five hours of lecture per week. Prerequisite: MATH 241. Corequisite: PHYS 217.

PHYS 252  College Physics II  (5)
Second part of calculus-based introduction to physics, including electricity, magnetism, electromagnetic waves, optics, and modern physics. Five hours of lecture per week. Prerequisite: PHYS 251. Corequisite: PHYS 218.

PHYS 331  Heat and Thermodynamics  (3)
Temperature measurement, thermal properties, heat transfer, kinetic theory, equations of state, heat-work cycles, laws of thermodynamics, entropy. Three hours of lecture per week. Prerequisites: PHYS 218, PHYS 252, and MATH 333. Offered as needed.

PHYS 332  Introduction to Modern Physics  (3)
Topics in modern physics, including special theory of relativity, introduction to quantum physics, and applications to atomic and nuclear structure. Three hours of lecture per week. Prerequisites: PHYS 251, PHYS 252, PHYS 217, and PHYS 218.

PHYS 333  Electricity and Magnetism I  (3)
Electric fields, potential, conductors, dielectrics, capacitors, and DC circuits. Three hours of lecture per week. Prerequisites: PHYS 218 and 252. Offered as needed.

PHYS 334  Electricity and Magnetism II  (3)
Magnetic fields, inductance, AC circuits, and electromagnetic theory. Three hours of lecture per week. Prerequisite: PHYS 333. Offered as needed.

PHYS 335  Mechanics I  (3)
Dynamics, kinematics, oscillations, deformable bodies and wave motion. Three hours of lecture per week. Prerequisites: PHYS 218 and PHYS 252. Offered as needed.

PHYS 336  Mechanics II  (3)
Mechanics of a rigid body, Lagrange’s equations, and Hamilton’s equations. Three hours of lecture per week. Prerequisite: PHYS 335. Offered as needed.

PHYS 338  Mathematical Methods for Physics I  (3)
Applications to physics of the following: series, complex numbers, linear equations, partial differentiation, vector analysis, Fourier series, and ordinary differential equations. Three hours of lecture per week. Prerequisites: MATH 242 and PHYS 251. Offered as needed.

PHYS 339  Mathematics Methods for Physics II  (3)
Applications to physics of the following: calculus of variations, coordinate transformations, special functions, partial differential equations, complex variables, integral transforms, and probability. Three hours of lecture per week. Prerequisites: PHYS 252 and PHYS 338. Offered as needed.

PHYS 341  Computational Physics I  (3)
Use of mathematics software to build skills for physics problem solving. Numerical analysis, numerical integration, and extrapolation of differential equations as applied to physics problems in mechanics, electricity and magnetism, heat and thermodynamics. Three hours of lecture per week. Prerequisites: junior standing and consent of the department chair.

PHYS 342  Computational Physics II  (3)
Continuation of PHYS 341. Three hours of lecture per week. Prerequisite: PHYS 341.
PHYS 344  Electronics  (4)
Theory and practical operation of modern electronics for students completing Physics 252. Three hours of lecture and three hours of laboratory per week. Prerequisites: PHYS 218 and PHYS 252.

PHYS 433  Quantum Mechanics  (3)
Basic postulates, Schrodinger's equation, barrier transmission, energy levels in square well, harmonic oscillator and hydrogen atom, angular momentum, perturbation theory. Three hours of lecture per week. Prerequisites: PHYS 334 and PHYS 336. Offered as needed.

PHYS 447  Atomic and Nuclear Physics  (4)
Special theory of relativity, particle properties of electromagnetic radiation, wave properties of particles, Rutherford-Bohr model of the atom, nuclear reactions, elementary particles, and statistical mechanics. Four hours of lecture per week. Prerequisites: PHYS 334 and PHYS 336. Offered as needed.

PHYS 495  Independent Study  (2)
Detailed study of an advanced topic in physics under the guidance of an instructor. Consent of the Department required. May be enrolled for up to 4 semester credit hours.

PHYS 497  Topics in Physics  (3)
Current topics in the various branches of physics such as quantum mechanics, space physics, solid state physics, atomic and nuclear physics, and biophysics. May be repeated for credit as topics vary. Three hours of lecture per week. Prerequisites: senior standing and consent of the department chair.
# CURRICULUM SUMMARY FOR
## BACHELOR OF SCIENCE DEGREE IN PHYSICS
### TOTAL CREDITS REQUIRED: 133

<table>
<thead>
<tr>
<th>CORE CURRICULUM (STANDARD)*</th>
<th>MAJOR (PHYSICS)</th>
<th>OTHER REQUIREMENTS</th>
<th>MINOR REQUIREMENTS</th>
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<tr>
<td>or SOC 158 (3)</td>
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<tr>
<td>CS 116 (3)</td>
<td>Approved substitute</td>
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* Students should be advised by a major advisor prior to registering for any credit, particularly any core curriculum credit as listed.

** (N) represents the number of course credits.
## Major/Associated Courses for the Bachelor of Science Degree in Physics
### By Level and Sequence

### Freshman

**First Semester**
- MATH 136 (Pre-Calculus Mathematics), 3 cr
- CS 116 (Introduction to Computer Science I), 3 cr

**Second Semester**
- MATH 241 (Calculus and Analytic Geometry II), 4 cr
- CS 120 (Introduction to UNIX), 3 cr
- CS 124 (Fundamentals of Machine Computation), 3 cr

### Sophomore

**First Semester**
- PHYS 217 (College Physics Laboratory I), 1 cr
- PHYS 251 (College Physics I), 5 cr
- MATH 242 (Calculus and Analytic Geometry II), 4 cr

**Second Semester**
- PHYS 218 (College Physics Laboratory II), 1 cr
- PHYS 252 (College Physics II), 5 cr
- MATH 314 (Calculus and Analytic Geometry III), 4 cr
- MATH 330 (Linear Algebra), 3 cr

### Junior

**First Semester**
- PHYS 333 (Electricity and Magnetism I), 3 cr
- PHYS 344 (Electronics), 4 cr
- PHYS 335 (Mechanics), 3 cr
- PHYS 338 (Mathematical Methods for Physics I), or PHYS 341 (Computational Physics I), 3 cr
- MATH 333 (Differential Equations), 3 cr

**Second Semester**
- PHYS 331 (Heat and Thermodynamics), or PHYS 332 (Introduction to Modern Physics) 3 cr
- PHYS 334 (Electricity and Magnetism), 3 cr
- PHYS 336 (Mechanics II), 3 cr
- PHYS 339 (Mathematical Methods for Physics II), or PHYS 342 (Computational Physics II), 3 cr

### Senior

**First Semester**
- PHYS 433 (Quantum Mechanics), or PHYS 497 (Topics in Physics), 3 cr
- PHYS 447 (Atomic and Nuclear Physics), or Approved Substitute, 4 cr

**Second Semester**
- Open