Bachelor of Science in Physics/Master's in Materials Science and Engineering Fast Track Program

Department of Physics

2022-2023 Catalog

NAME: **UTA ID:**

Advisor's Signature: **Date:** 10/5/2022

CORE CURRICULUM & ELECTIVES

	Earned	Need
University Required course		
UNIV-SC 1101 - CAREER PREPARATION AND STUDENT SUCCESS		1
COMMUNICATION - 6 hours		
ENGL 1301 - Rhetoric and Composition I	0	3
ENGL 1302 - Rhetoric and Composition II *prereq* : C or better in ENGL 1301	0	3
Total	0	6
CREATIVE ARTS - 3 hours (*select one of the following* : ART 1301, MUSI 1300, THEA 1342, THEA 1343)		
	0	3
GOVERNMENT/POLITICAL SCIENCE - 6 hours		
POLS 2311 - Government of the United States	0	3
POLS 2312 - State and Local Government	0	3
Total	0	6
LANGUAGE, PHILOSOPHY AND CULTURE - 3 hours (*select one of the following* : ANTH 2322, ARAB 2314, ARCH 2300, ART 1309, ART 1310, ART 1317, CHIN 2314, ENGL 2303, ENGL 2309, ENGL 2319, ENGL 2329, FREN 2314, GERM 2314, GLOBAL 2301, INTS 1310, KORE 2314, LING 2371, PHIL 1304, PHIL 1310, PHIL 2300, PORT 2314, RUSS 2314, SPAN 2314)		
	0	3
LIFE AND PHYSICAL SCIENCE - 6 hours		
PHYS 1443 - General Technical Physics I *prereq* : MATH 1426	0	4
PHYS 1444 - General Technical Physics II *prereqs* : prereqs: C or better in PHYS 1443 & MA concurrent enrollment	0	4
Total	0	8
MATHEMATICS - 6 hours		
MATH 1426 - Calculus I *prereq* : C or better in MATH 1421 Prerequisite: C or better in MATH 1 Test scores	0	4
MATH 2425 - Calculus II *prereq* : C or better in MATH 1426	0	4
Total	0	8
SOCIAL AND BEHAVIORAL SCIENCES - 3 hours (*select one of the following* : ANTH 1306, CRCJ 2334, ECON 2305, ECON 2306, ECON 2337, FINA 2330, IE 2308, LING 2301, MANA 2302, PSYC 1315, SOCI 1311, SOCI 2312)		
	0	3
U.S. HISTORY - 6 hours-HIST 1301, 1302, 1331 or 1332 -		
HIST 1301 - History of the U.S. to 1865 prereq: ENGL 1301 or concurrent enrollment	0	3
HIST 1302 - History of the U.S., 1865 to Present prereq: ENGL 1301 or concurrent enrollment	0	3
Total	0	6
FOUNDATIONAL COMPONENT AREA - 3 hours (any core course, cannot double-count)		
	0	3
GENERAL ELECTIVES *as needed to total 120 hours for degree*		
	0	8

ADDITIONAL DEGREE REQUIREMENTS

COMMUNICATION COMPETENCE - satisfied by PHYS 4117		*
COMPUTER COMPETENCE - satisfied by Computer Science requirement		*

SCIENCE

COMPUTER SCIENCE -		
select one of the following:	0	3
DATA 3401 — Python for Data Science 1		
CSE 1311. INTRODUCTION TO PROGRAMMING FOR ENGINEERS Prerequisite: C or better in or concurrent enrollment (MATH 1421, MATH 1426, MATH 2425, MATH 2326, MATH 3330, HONR-SC		
PHYS 2321 - Computational Physics prereq: PHYS 1444		
MATH 3345 - Numerical Analysis and Computer Applications prereqs: C or better in MATH 2326 & C or better in MATH 3319 or 3330 C or better in MATH 3319 or 3330		
CHEMISTRY - 8 hours		
CHEM 1441 - General Chemistry I prereq: ALEKS pre-assignment. , MATH 1302 or 1 or appropriate ACT Math, SAT Math, or Math Placement Test score	0	4
CHEM 1442 - General Chemistry II *prereq* : C or better in CHEM 1441	0	4
Total	0	8
BIOLOGY, CHEMISTRY, OR GEOLOGY - 4 hours		
BIOL 1441, 4hr CHEM , or 4hr GEOL course for majors	0	4
MATHEMATICS (additional) - 6 hours		
MATH 2326 - Calculus III *prereq* : C or better in MATH 2425	0	3
MATH 3319 - Differential Equations & Linear Algebra *prereq* : C or better in MATH 2326 or concurrent enrollment	0	3
or MATH 3318 - Differential Equations *prereq* : C or better in MATH 2326 or concurrent enrollment		
Total	0	6
MAJOR: Physics - 33 hours		
PHYS 2311 - Mathematical Methods of Physics *prereqs* : PHYS 1444 & MATH 2425	0	3
PHYS 3313 - Introduction to Modern Physics *prereqs* : PHYS 1444 & MATH 2425	0	3
PHYS 3183 - Modern Physics Laboratory *prereq* : PHYS 3313 or concurrent enrollment	0	1
PHYS 3321 - Intermediate Electricity and Magnetism *prereqs* : PHYS 2311 & MATH 3318 or 3319	0	3
PHYS 4315 - Thermodynamics and Statistical Mechanics *prereqs* : PHYS 3313 & MATH 2326	0	3
PHYS 4326 - Introduction to Quantum Mechanics *prereqs* : PHYS 3313 & MATH 3318 or 3319	0	3
PHYS 3445 - Optics *prereqs* : PHYS 1444 & MATH 2425	0	4
PHYS 4117 - Individual Learning By Seminar *prereqs* : 18 hours of Physics & senior standing	0	1
PHYS electives - 12 hours (no more than 4 hours can be used from PHYS 4181, 4281		
ANY Physics advanced (3000/4000-level) elective 3hr or 4hr courses not listed above		
	0	4
	0	4
	0	4
Total	0	33

PHYS 4327 Quantum Mechanics II is recommend for graduate school

CONCENTRATION: Materials Science and Engineering - 12 hours		
MSE 5300 (3-0) Introduction to Materials Science and Engineering	0	3
MSE graduate or advanced (5000-level) elective approved by MSE advisor	0	3
MSE graduate or advanced (5000-level) elective approved by MSE advisor	0	3
MSE graduate or advanced (5000-level) elective approved by MSE advisor	0	3
Total	0	12

Graduate Student Contact: **Natalie M. Burden** 817-272-2398 mse@uta.edu

Gradute Advisor: **Seong Jin Koh** 817-272-1223 skoh@uta.edu

TOTAL DEGREE HOURS - must have 120 to graduate	0	120
TOTAL ADVANCED (3000/4000-LEVEL) HOURS - 9 graduate hours may count towards total	0	36
TOTAL RESIDENCY HOURS - must have 30 to graduate	0	30

Fast Track admission requirements: 30 hours completed at UTA, 3.0 cumulative GPA, 3.3 GPA in MSE 5300, PHYS 3313, & PHYS 3321. See MSE graduate advisor for information about that program.

Students must apply for Physics graduation through MyMav by the beginning of their final undergraduate semester.

ANY Physics, Astrophysics, or Astronomy 3hr or 4hr advanced (3000/4000-level) courses not listed as a degree requirement can be used as elective

PHYSICS MAJOR COURSE ROTATION SCHEDULE *subject to change*

FALL & SPRING: PHYS 2311 (Mathematical Methods of Physics),PHYS 3313 (Introduction to Modern Physics), HYS 3183 (Modern Physics Laboratory), **PHYS 4117 (**Individual Learning By Seminar)

FALL: PHYS 2321 (Computational Physics), PHYS 3321 (Intermediate Electricity and Magnetism), PHYS 4315 (Thermodynamics and Statistical Mechanics), PHYS 4326 (Introduction to Quantum Mechanics)

SPRING: PPHYS 4319 (Advanced Mechanics), PHYS 4324 (Advanced Electricity and Magnetism)

Students must maintain a minimum 2.25 cumulative GPA and a 2.25 Physics GPA. Failure to do so may result in dismissal from the College of Science.

Note: Students are encouraged to sign up for 1 or 2 hours research before or concurrent with signing up for PHYS 4117 seminar. The students may then use their research activities as the basis of their Seminar presentations.

Notes

T = transfer credit to UTA as soon as possible

? = may have credit; need to transfer it to UTA and/or Admissions needs to evaluate it

cc = can be taken at a community college (consult Transfer Equivalency Guide)

IP = course in progress; credit not yet earned

sub = credit earned but it needs to be subbed on UMAP for graduation

Fast Track Program with Physics Undergraduate Degree and Master's Degree in Materials Science and Engineering

The Fast Track Program enables outstanding senior undergraduate students in Physics to satisfy degree requirements leading to a Bachelor's degree in Physics while simultaneously pursuing a Master's degree in Materials Science and Engineering. The essential elements of the Fast Track Program involve the use of up to 9 hours of graduate coursework to apply towards an undergraduate degree in Physics.

Students who complete PHYS 1443 and PHYS 1444 with a GPA of 3.0 and express an interest in the Fast Track Program will be designated as "Fast Track Bound" and encouraged to maintain a GPA of 3.0 or better to retain their eligibility. Students who have been identified as "Fast Track Bound" as well as other outstanding undergraduates in Physics can apply for the Fast Track Program when they are within 30 hours of completing their Bachelor's degree. They must have completed at least 30 hours at UTA, have a GPA of at least 3.0 in those courses, and have an overall GPA of 3.0 or better in all college courses. Additionally, they must have completed 6 hours of specified undergraduate Foundation Courses that are listed below with a GPA of 3.0 in these courses.

Foundation Courses Required for Admission into the Fast Track Program:

PHYS 3313. MODERN PHYSICS (3-0).

PHYS 3321. INTERMEDIATE ELECTRICITY AND MAGNETISM (3-0).

Students need not complete the program to receive their bachelor's degrees and may elect to end participation at any time. Graduate and undergraduate courses completed while participating in the Fast Track program will be selected so that they may be applied to the bachelor's degree even if the student exits the program before completing all available courses.

Course Requirements for Fast Track Master of Science (MS-Thesis Substitute) Degree:

Course Group	Courses	Credit Hours
Graduate courses for BS degree	MSE 5300 (3-0) Introduction to Materials Science and Engineering	9
	Select 2 courses	
	Any MSE Graduate Courses	
	PHYS 5307 (3-0) Quantum Mechanics	
	PHYS 5328. (3-0) Surface Physics	
	PHYS 5330. (3-0) Physics of Semiconductor Processing and Characterization	
18 credit hours of additional graduate coursework (see the requirements below)*		18
MSE 5394 Master's Research Project in Materials Science and Engineering		3

Course Requirements for Fast Track Master of Science (MS) with Thesis Degree:

Course Group	Courses	Credit Hours
Graduate courses for BS degree	MSE 5300 (3-0) Introduction to Materials Science and Engineering	9
	Select 2 courses	
	Any MSE Graduate Courses	
	PHYS 5307 (3-0) Quantum Mechanics	
	PHYS 5328. (3-0) Surface Physics	
	PHYS 5330. (3-0) Physics of Semiconductor Processing and Characterization	
15 credit hours of additional graduate coursework (see the requirements below)*		15
Master's Thesis		6
Total Credit Hours		30

Course Requirements for Fast Track Master of Engineering (ME) Degree:

Course Group	Courses	Credit Hours
Graduate courses for BS degree	MSE 5300 (3-0) Introduction to Materials Science and Engineering	9
	Select 2 courses	
	Any MSE Graduate Courses	
	PHYS 5307 (3-0) Quantum Mechanics	
	PHYS 5328. (3-0) Surface Physics	
	PHYS 5330. (3-0) Physics of Semiconductor Processing and Characterization	
21 credit hours of additional graduate coursework (see the requirements below)*		21
Total Credit Hours		30

***Students must meet the following requirements to complete Master's degree:**

1. Successful completion in the four core courses:
MSE 5304 Analysis of Materials
MSE 5305 Solid State Physics and Thermodynamics of Materials
MSE 5312 Mechanical Behavior of Materials
MSE 5321 Phase Transformations of Materials
2. Total of 24 credit hours in MSE is required.