

APPLIED PHYSICS, B.S. (NJCU) AND MECHANICAL ENGINEERING, B.S. (NJIT), DUAL DEGREE (3 + 2) PROGRAM

This dual-degree program is designed for students interested in Physics and Mechanical Engineering. New Jersey City University and New Jersey Institute of Technology jointly offer a five-year program of study leading to a Bachelor of Science in Physics from NJCU and a Bachelor of Science in Mechanical Engineering from NJIT. Earning these two degrees increases the chances of obtaining a better entry-level position and opens the door to greater career possibilities. This program combines a traditional liberal arts environment with an intensive technical curriculum.

This dual-degree program is an excellent choice for students who understand the value of a liberal arts education, are interested in careers in the physical sciences and engineering, wish to work as engineers while having a strong background in physics, and wish to maximize their career options.

Students enter as full-time, degree-seeking freshmen and continue their studies for three years at NJCU while taking occasional classes at NJIT, during which time the General Education coursework and the majority of Physics degree requirements from NJCU are satisfied. Students enroll full-time at NJIT during the fourth and fifth years of the program, during which time students focus on required engineering courses, some of which satisfy NJCU's Physics degree requirements. A B.S. in Applied Physics is awarded by NJCU at the end of the fourth year and a B.S. in Mechanical Engineering is awarded by NJIT at the end of the fifth year.

Students interested in this dual-degree program are strongly encouraged to select the major as soon as possible upon enrolling at NJCU in consultation with a faculty advisor from the Physics Department. The advisor will assist students in planning the program of study in order to complete the program requirements within the five-year time span.

Requirements for admission into the program are a 2.5 or better cumulative GPA and a 3.0 or better GPA in Math and Sciences.

Code	Title	Credits
Required Courses		
PHYS 140	Principles of Physics I - Lecture	3
PHYS 1140	Principles of Physics I - Laboratory and recitation	1
PHYS 141	Principles of Physics II - Lecture	3
PHYS 1141	Principles of Physics II - Laboratory and Recitation	1
PHYS 230	Physics III (Lecture)	3
PHYS 1230	Physics III Recitation & Laboratory	1
PHYS 301	Thermodynamics and Kinetic Theory	3
PHYS 321	Theory and Applications of Electricity and Magnetism	3
PHYS 405	Introduction to Quantum Mechanics	3
PHYS 410	Classical Mechanics	4

PHYS 321	Theory and Applications of Electricity and Magnetism	3
CHEM 105	General Chemistry I Lecture	3
CHEM 1105	General Chemistry I Recitation/Laboratory	2
CHEM 106	General Chemistry II Lecture	3
CHEM 1106	General Chemistry II Recitation/Laboratory	2
MATH 192	Calculus and Analytic Geometry I	4
MATH 193	Calculus and Analytic Geometry II	4
MATH 292	Calculus & Analytical Geometry III	4
MATH 311	Differential Equations for Engineers	4
ECON 208	Principles of Economics:Micro	3
Required Courses Taken at NJIT		
FED 101: Fundamentals of Engineering Design - Taken at NJIT		1
MECH 234	Engineering Mechanics	1
CIS 101	Computer Programming and Problem Solving - Taken at NJIT	3
ME 215	Engineering Materials and Processes - Taken at NJIT	3
MATH 279	Statistics and Probability for Engineers - Taken at NJIT	3
ME	Kinematics of Machinery - Taken at NJIT	3
MECH 236	Dynamics - Taken at NJIT	3
MECH 237	Strength of Materials - Taken at NJIT	
PHYS 450	Advanced Physics Laboratory (1-4-3) - Taken at NJIT	4
ECE 405	Electrical Engineering Principles (3-0-3) - Taken at NJIT	
ME 305	Introduction to System Dynamics (3-0-3) - Taken at NJIT	
ME 311	Thermodynamics (3-0-3) - Taken at NJIT	
ME 315	Stress Analysis (3-0-3) - Taken at NJIT	
PHIL 334	Engineering Ethics (3-0-3) - Taken at NJIT	
ME 304	Fluid Mechanics (3-0-3) - Taken at NJIT	
ME 312	Thermodynamics II (3-0-3) - Taken at NJIT	
ME 316	Machine Design (3-0-3) - Taken at NJIT	
ME 343	Mechanical Laboratory I (2-2-3) - Taken at NJIT	
ME 430	Introduction to Computer-Aided Design (2-2-3) - Taken at NJIT	
ME 403	Mechanical System Design I (2-1-3) - Taken at NJIT	
ME 405	Mechanical Laboratory II (1-2-2) - Taken at NJIT	
ME 407	Heat Transfer (3-0-3) - Taken at NJIT	
ELEC	Open GUR (3-0-3) - Taken at NJIT	
ELEC	ME/TE (3-0-3) 4 courses total - Taken at NJIT	
ME 406	Mechanical Laboratory III (1-2-2) - Taken at NJIT	
ME 408	Mechanical Design II (1-2-2) - Taken at NJIT	
ELEC	Management: GUR (3-0-3) - Taken at NJIT	
ELEC	Capstone Seminar (3-0-3) - Taken at NJIT	

First Year**Semester 1**

ENGL 101 or ESL 101	English Composition I or English Composition I for English as a Second Language Students	4 - 6
MATH 192	Calculus and Analytic Geometry I	4
PHYS 140	Principles of Physics I - Lecture	3
PHYS 1141	Principles of Physics II - Laboratory and Recitation	1
CHEM 105	General Chemistry I Lecture	3
CHEM 1105	General Chemistry I Recitation/Laboratory	2
Credits		17-19

Semester 2

ENGL 102 or ESL 102	English Composition II or English Composition 2 ESL	4 - 6
MATH 193	Calculus and Analytic Geometry II	4
PHYS 141	Principles of Physics II - Lecture	3
PHYS 1141	Principles of Physics II - Laboratory and Recitation	1
CHEM 106	General Chemistry II Lecture	3
CHEM 1106	General Chemistry II Recitation/Laboratory	2
Credits		17-19

Second Year**Semester 1**

PHYS 230	Physics III (Lecture)	3
PHYS 1230	Physics III Recitation & Laboratory	1
MATH 292	Calculus & Analytical Geometry III	4
ECON 208	Principles of Economics:Micro	3
General Education	Tier I or II Course	3
Credits		14

Semester 2

PHYS 321	Theory and Applications of Electricity and Magnetism	3
PHYS 405	Introduction to Quantum Mechanics	3
MATH 311	Differential Equations for Engineers	4
FED 101	Fundamentals of Engineering Design - Taken at NJIT	1
MECH 234	Engineering Mechanics - Taken at NJIT	1
CIS 101	Computer Programming and Problem Solving - Taken at NJIT	3
Credits		15

Third Year**Semester 1**

PHYS 301	Thermodynamics and Kinetic Theory	3
PHYS 410	Classical Mechanics	4
MECH 215	Engineering Materials and Processes - Taken at NJIT	3
MATH 279	Statistics and Probability for Engineers - Taken at NJIT	3
Credits		13

Semester 2

MECH 231	Kinematics of Machinery - Taken at NJIT	3
MECH 236	Dynamics - Taken at NJIT	3

MECH 237	Strength of Materials - Taken at NJIT	3
PHYS 450	Advanced Physics Laboratory (1-4-3) - Taken at NJIT	4
Credits		13

Fourth Year**Semester 1**

ALL COURSES TAKEN AT NJIT		
ECE 405	Electrical Engineering Principles (3-0-3)	
ME 305	Introduction to System Dynamics (3-0-3)	
ME 311	Thermodynamics I (3-0-3)	
ME 315	Stress Analysis (3-0-3)	
PHIL 334	Engineering Ethics (3-0-3)	
Credits		0

Semester 2

ALL COURSES TAKEN AT NJIT		
ME 304	Fluid Mechanics (3-0-3)	
ME 312	Thermodynamics II (3-0-3)	
ME 316	Machine Design (3-0-3)	
ME 343	Mechanical Laboratory (2-2-3)	
ME 430	Introduction to Computer-Aided Design (2-2-3)	
Credits		0

Fifth Year**Semester 1**

ALL COURSES TAKEN AT NJIT		
ME 403	Mechanical System Design I (2-1-3)	
ME 405	Mechanical Laboratory II (1-2-2)	
ME 407	Heat Transfer (3-0-3)	
ELEC	Open GUR (3-0-3)	
ELEC	ME/TE (3-0-3)	
ELEC	ME/TE (3-0-3)	
Credits		0

Semester 2

ALL COURSES TAKEN AT NJIT		
ME 406	Mechanical Laboratory III (1-2-2)	
ME 408	Mechanical Systems Design II (1-2-2)	
ELEC	ME/TE (3-0-3)	
ELEC	ME/TE (3-0-3)	
ELEC::	GUR (3-0-3)	
Management		
ELEC	Capstone Seminar: GUR (3-0-3)	
Credits		0

Total Credits **89-93**

Student Learning Outcomes

Upon completion of the Applied Physics BS (NJCU) and Mechanical Engineering BS (NJIT), Dual Degree (3+2) program, students will be able to:

1. Demonstrate knowledge of the factual and theoretical basis of physics including Newton's Laws of motion, conservation laws, E&M and Quantum Mechanics.
2. Demonstrate understanding of scientific inquiry and explain how scientific knowledge is discovered and validated.

3. Apply quantitative reasoning to describe or explain phenomena in the natural world.
4. Demonstrate knowledge of mathematical tools and their applications to understanding physics systems.
5. Communicate scientific information based on original research or literature review.
6. Demonstrate preparedness to enter the work force or Graduate School.