

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

This dual-degree program is designed for students interested in Physics and Civil 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 Civil 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 Civil 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
<b>Required Courses:</b>		
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 321	Theory and Applications of Electricity and Magnetism	3
PHYS 301	Thermodynamics and Kinetic Theory	3
PHYS 405	Introduction to Quantum Mechanics	3
PHYS 410	Classical Mechanics	4

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 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	1
MECH 235	Statics	3
CIS 101	Computer Programming and Problem Solving	3
CE 200	Surveying	3
CE 200A	Surveying Laboratory	
MATH 279	Statistics and Probability for Engineers	3
CE 210	Construction Materials and Procedures	3
CE 260	Civil Engineering Methods	3
MECH 237	Strength of Materials	3
PHYS 450	Advanced Physics Laboratory	
CE 320	Fluid Mechanics	
CE 320A	Hydraulics Laboratory	
CE 321	Water Resources Engineering	
CE 332	Structural Analysis	
MECH 236	Dynamics	
EnE 262	Introduction to Environmental Engineering	
CE 333	Reinforced Concrete Design	
CE 341	Soil Mechanics	
CE 341A	Soil Mechanics Laboratory	
CE 350	Transportation Engineering	
CE 341	Construction Materials Lab	
CE 432	Steel Design	
CE 443	Foundation Design	
CE 494	Civil Engineering Design I	
ELEC	Technical (3-0-3)	
ELEC	Science Elective (3-0-3)	
ELEC	CE Elective (3-0-3)	
ELEC	Management: GUR (3-0-3)	
ELEC	Capstone Seminar 400 Level: GUR (3-0-3)	

## First Year

Semester 1		Credits
ENGL 101 or ESL 101	English Composition I or English Composition I for English as a Second Language Students	4
MATH 192	Calculus and Analytic Geometry I	4
PHYS 140	Principles of Physics I - Lecture	3
PHYS 1140	Principles of Physics I - Laboratory and recitation	1
CHEM 105	General Chemistry I Lecture	3
CHEM 1105	General Chemistry I Recitation/Laboratory	2

INTD 101	Orientation to College <sup>*First time Freshmen Only</sup>	1
<b>Credits</b>		<b>18</b>
<b>Semester 2</b>		
ENGL 102 or ESL 102	English Composition II or English Composition 2 ESL	4
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
<b>Credits</b>		<b>17</b>
<b>Second Year</b>		
<b>Semester 1</b>		
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
<b>Credits</b>		<b>14</b>
<b>Semester 2</b>		
PHYS 321	Theory and Applications of Electricity and Magnetism	3
MATH 311	Differential Equations for Engineers	4
FED 101	Fundamentals of Engineering Design (Taken at NJIT)	1
MECH 235	Statics (Taken at NJIT)	3
CIS 101	Computer Programming and Problem Solving (Taken at NJIT)	3
<b>Credits</b>		<b>14</b>
<b>Third Year</b>		
<b>Semester 1</b>		
PHYS 301	Thermodynamics and Kinetic Theory	3
PHYS 410	Classical Mechanics	4
CE 200	Surveying (Taken at NJIT)	3
CE 200A: Surveying Laboratory (Taken at NJIT)		3
MATH 279	Statistics and Probability for Engineers (Taken at NJIT)	3
<b>Credits</b>		<b>16</b>
<b>Semester 2</b>		
PHYS 405	Introduction to Quantum Mechanics	3
CE 210	Construction Materials and Procedures (Taken at NJIT)	3
CE 260	Civil Engineering Methods (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
<b>Credits</b>		<b>16</b>
<b>Fourth Year</b>		
<b>Semester 1</b>		
ALL COURSES TAKEN AT NJIT		
CE 320	Fluid Mechanics (4-0-4)	
CE 320A	Hydraulics Laboratory (0-3-1)	

CE 321	Water Resources Engineering (3-0-3)	
CE 332	Structural Analysis (2-0-2)	
MECH 236	Dynamics (2-0-2)	
EnE 262	Introduction to Environmental Engineering (3-1-3)	
<b>Credits</b>		<b>0</b>
<b>Semester 2</b>		
ALL COURSES TAKEN AT NJIT		
CE 431	Reinforced Concrete Design (3-0-3)	
CE 341	Soil Mechanics (3-0-3)	
CE 341A	Soil Mechanics Laboratory (0-3-1)	
CE 350	Transportation Engineering (3-0-3)	
ELEC	Technical (3-0-3)	
<b>Credits</b>		<b>0</b>
<b>Fifth Year</b>		
<b>Semester 1</b>		
ALL COURSES TAKEN AT NJIT		
CE 431	Construction Materials Lab (0-3-1)	
CE 432	Steel Design (3-0-3)	
CE 443	Foundation Design (3-0-3)	
CE 494	Civil Engineering Design I (3-0-3)	
CE XXX	Civil Engineering Elective (3-0-3)	
HSS ELEC	Communications Elective 300 level (3-0-3)	
<b>Credits</b>		<b>0</b>
<b>Semester 2</b>		
ALL COURSES TAKEN AT NJIT		
CE 495	Civil Engineering Design II (3-0-3)	
ELEC	Science Elective (3-0-3)	
CE XXX	Civil Engineering Elective (3-0-3)	
ELEC	Management: GUR (3-0-3)	
ELEC	Capstone Seminar 400 Level: GUR (3-0-3)	
<b>Credits</b>		<b>0</b>
<b>Total Credits</b>		<b>95</b>

### Student Learning Outcomes

Upon completion of the Applied Physics BS (NJCU) and Civil 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.