Physics

William D. Thacker, Ph.D., Chair

http://www.slu.edu/x14154.xml

Faculty:

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The Department of Physics offers two undergraduate degrees in Physics: the Bachelor of Science (B. S.) degree for students enrolled in Parks College and the Bachelor of Arts (B. A.) degree for students in the College of Arts and Sciences. The department also offers a Bachelor of Science (B. S.) degree in Engineering Physics for students enrolled in Parks College. (See College of Arts and Sciences Section for the B. A. degree program.) In addition, the department offers Minors in Physics, useful primarily to students majoring in mathematics, computer science, engineering fields, and other sciences. Major-minor links between physics and other disciplines provide opportunities for students to acquire valuable analytical and problem-solving skills and to distinguish themselves from others pursuing similar career paths.

Physics (B. S.)

The Bachelor of Science degree stresses undergraduate research and applications of computers in physics, taking advantage of the unique facilities of Parks College within the University. A focused set of electives, the Allied Electives, allows a student to adapt the program to his or her own post-baccalaureate plans. For example, a student may use these electives to earn a minor in some other field, a double major in physics and mathematics or, in nine or ten semesters, to earn a double major in physics and engineering, or computer science. A student might use these electives to prepare for graduate school in physics or a related field, or for medical school.

The required courses listed below are accompanied by the Parks College core. This degree is conferred by Parks College. This curriculum also satisfies all requirements for a Minor in Engineering Mathematics.

Prerequisites (28 credits)	
PHYS 1110 Introduction to Physics (as a career)	1
CHEM 1110/1115 General Chemistry I/Lab	4
PHYS 1610/1620 Engineering Physics I/Lab	4
PHYS 1630/1640 Engineering Physics II/Lab	4
MATH1510 Calculus I	4
MATH 1520 Calculus II	4
MATH2530 Calculus III	4
CSCI 1060 Intro.to CS: Scientific Programming	3
Required Physics & Mathematics Courses (39 credi	ts)
PHYS 2610 Modern Physics	3
PHYS 2620 Modern Physics Lab	1
PHYS 3110 Classical Mechanics	
PHYS 3610 Modern Physics II	3
PHYS 4210 Electricity & Magnetism I	3 3 3
PHYS 4610 Quantum Mechanics	3
PHYS 3310/3320 Optics/Lab	4
PHYS 3410 Thermodynamics& Statistical Mechanics	3
PHYS 3510 Analog & Digital Electronics/Lab	4
MATH3550 Differential Equations I	
MATH3270 Advanced Mathematics for Engineers	3 3 3
MATH3240 Numerical Analysis	3
MATH3850 Foundations of Statistics	3
Additional Dequipments (Caradita)	
Additional Requirements (6 credits) Two additional upper division physics courses (minimum 6	
credits) selected from the list below.	
PHYS 3120 Advanced Classical Mechanics	2
	3
PHYS 4220 Electricity & Magnetism II PHYS 4620 Application of Quantum Maghanica	3
PHYS 4620 Application of Quantum Mechanics	3
Research Experience (3 credits)	
PHYS 3860 Physics Research I	0
PHYS 4870 Physics Research II	0
PHYS 4880 Physics Research III	3
Allied Electives (21 credits)	
Seven Courses Selected with Mentor	21
College Core (22 credits)	
ENGL 1900 Adv. Rhet. & Research or 1920 Adv. Writing	3
CMM 2200 Small Group Presentation	1
THEO 1000 Theological Foundations	
PHIL 2050 Ethics	3
Social/Behavioral Science Elective	3
Humanities Elective	3
General Elect (Soc./Behav. or Humanities)	3
Cultural Diversity Elective	3

Cultural Diversity, Humanities, and Social/Behavioral Science elective courses must be selected from an approved list. See the Parks College introduction in this catalog for more information.

Open Elective (3 credits)

One Course 3

Physics Minor

A **Parks College** student can earn a minor in physics by completing at least 22 credits of physics consisting of:

PHYS 1610/1620 Engineering Physics I/Lab

4 PHYS 1630/1640 Engineering Physics II/Lab

4 PHYS 2610/2620 Modern Physics/Lab

4 Three physics courses (one with lab) numbered

PHYS3000 – PHYS 4930

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A College of Arts & Sciences student can earn a minor in physics by completing at least 18 credits of physics consisting of: PHYS 1610/1620 Engineering Physics I/Lab 4
PHYS 1630/1640 Engineering Physics II/Lab 4
PHYS 2610/2620 Modern Physics/Lab 4
Two physics courses numbered PHYS3000–PHYS4930 6

Engineering Physics (B. S.)

The Department of Physics, in collaboration with the Engineering Departments of Parks College offers a Bachelor of Science Degree in Engineering Physics that prepares students for a broad range of careers requiring scientific and technical knowledge. This program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. This program is ideally suited for those students who have an interest in and aptitude for both physics and engineering. The curriculum satisfies the requirements for a minor in Engineering Mathematics and has essentially the same physics content as our traditional B. S. degree. Students may select a concentration in Aerospace, Biomedical, Computer, Electrical, or Mechanical Engineering, or choose the Interdisciplinary Option. Each student completes a senior design project, typically as a member of a multidisciplinary team.

Program Educational Objectives

The undergraduate program is designed to meet the following specific objectives in order to fulfill the departmental and institutional missions. By three to five years after graduation, graduates of the engineering physics program will be:

- Engaged in successful public or private sector careers in engineering physics or a related field or as students pursing advanced or professional degrees
- Collaborating effectively on multi-disciplinary teams and communicating effectively both within the team and with stakeholders
- Advancing in their professional careers through taking on increasing responsibilities, pursuing lifelong learning, continuing professional development, and seeking professional registration as appropriate for their employers

 Acting responsibly, ethically and in the service of humanity when making personal and professional decisions

Student Outcomes

- an ability to apply knowledge of mathematics, science and engineering
- b. an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability
- d. an ability to function on multi-disciplinary teams
- e. an ability to identify, formulate, and solve engineering problems
- f. an understanding of professional and ethical responsibility
- g. an ability to communicate effectively
- h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and social context
- a recognition of the need for, and an ability to engage in life-long learning
- j. a knowledge of contemporary issues
- k. an ability to use techniques, skills, and modern engineering tools necessary for engineering practice

The required courses listed below are accompanied by the Parks College core. This degree is conferred by Parks College. This curriculum also satisfies all requirements for a Minor in Engineering Mathematics.

Concentration in Aerospace Engineering

Professional Orientation (1 credit required) Selected from the following:

PHYS 1110 Introduction to Physics (as a career) 1
AENG/MENG 1001 Introduction to AE & ME 1
BME 1000 Biomedical Engineering Orientation 1
ECE 1001 Introduction to ECE 1
(It is recommended that students in this concentration take PHYS 1110 & AENG 1001)

Basic Science & Mathematics (43 credits)

Busic Science & Machematics (16 creates)	
CHEM 1110/1115 General Chemistry I/Lab	4
MATH1510 Calculus I	4
MATH1520 Calculus II	4
MATH2530 Calculus III	4
MATH3550 Differential Equations I	3

MATH3270 Advanced Mathematics for Engineers	3	Cultural Diversity, Humanities, and Social/Behavioral Scient	nce
MATH3240 Numerical Analysis	3	elective courses must be selected from an approved list. See	e the
MATH3850 Foundations of Statistics	3	Parks College introduction in this catalog for more informat	tion.
PHYS 1610/1620 Engineering Physics I/Lab	4		
PHYS 1630/1640 Engineering Physics II/Lab	4	Open Elective (3 credits)	
PHYS 2610/2620 Modern Physics/Lab	4	One Course	3
PHYS 4610 Quantum Mechanics	3		
		Concentration in Biomedical Engineering	
Engineering Physics & Engineering Topics (58 credit	ts)	continuation in Bromeureur Engineering	
AENG 1002 Computer-Aided Engineering Design	1	Professional Orientation (1creditrequired)	
CSCI 1060 Scientific Programming	3	Selected from the following:	
ESCI 2100 Statics	3	PHYS 1110 Introduction to Physics (as a career)	1
ESCI 2150 Dynamics	3	AENG/MENG 1001 Introduction to AE & ME	1
ESCI 2300 Thermodynamics	3	BME 1000 Biomedical Engineering Orientation	1
ESCI 3200/3201 Fluid Dynamics/Lab	4	ECE 1001 Introduction to ECE	1
ESCI 3110 Linear Vibrations	3	ECE 1001 Introduction to ECE	1
PHYS 3310/3320 Optics/Lab	4	Pagia Sajanas & Mathematics (59 analita)	
PHYS 3510 Analog & Digital Electronics/Lab	4	Basic Science & Mathematics (58 credits)	4
PHYS 4210 Electricity & Magnetism I	3	CHEM 1110/11115 General Chemistry I/Lab	4
		CHEM 1120/1125 General Chemistry II/Lab	4
Two Engineering Physics Electives Selected From:		BIOL 1240/1245 Principles of Biology I/Lab	4
PHYS 3120 Advanced Classical Mechanics	3	BIOL 1260/1265 Principles of Biology II/Lab	4
PHYS 4010 Nanoscience and Nanofabrication Frontiers	3	BIOL 2600 Human Physiology	3
PHYS 4020 Experimental Physics	3	MATH1510 Calculus I	4
PHYS 4220 Electricity & Magnetism II	3	MATH1520 Calculus II	4
PHYS 4620 Application of Quantum Mechanics	3	MATH2530 Calculus III	4
PHYS 4930 Special Topics (Selected with mentor)	3	MATH3550 Differential Equations I	3
r (MATH3270 Advanced Mathematics for Engineers	3
One of the Two Following Tracks:		MATH3240 Numerical Analysis	3
Track1 Aeronautics		MATH3850 Foundations of Statistics	3
AENG 2000 Intro.to Aeronautics& Astronautics	3	PHYS 1610/1620 Engineering Physics I/Lab	4
AENG 3000 Performance	3	PHYS 1630/1640 Engineering Physics II/Lab	4
AENG 4400 Stability & Control	3	PHYS 2610/2620 Modern Physics/Lab	4
Two Upper Division Courses (AENG/ESCI 3xxx, 4xxx)	6	PHYS 4610 Quantum Mechanics	3
Track 2 Astronautics	•		
AENG 2000 Intro.to Aeronautics and Astronautics	3	Engineering Physics & Engineering Topics (48 credi	ts)
AENG 3150 Astrodynamics	3	BME 1010 Biomedical Engineering Introduction	1
AENG 4150 Orbital Mechanics	3	BME 2000 Biomedical Engineering Computing	3
Two Upper Division Courses (AENG/ESCI 3xxx, 4xxx)	6	BME 3200 Mechanics	3
Two opper Division Courses (ALIVO/ESCI SAAA, TAAA)	O	BME 4200 Biomechanics	3
Senior Design Project		PHYS 3410 Thermodynamics& Statistical Mechanics	3
AENG 4004 Flight Vehicle Analysis & Design I	3	ECE 2001/2002 Intro. to Electrical Engineering/Lab	4
AENG 4004 Flight Vehicle Analysis & Design I AENG 4014 Flight Vehicle Analysis & Design II	3	PHYS 3310/3320 Optics/Lab	4
AENO 4014 Flight Vehicle Analysis & Design II	3	PHYS 4210 Electricity & Magnetism I	3
College Core (22 credits)			
ENGL 1900 Adv. Rhet. & Research or 1920 Adv. Writing	3	Two Engineering Physics Electives Selected From:	
CMM 2200 Small Group Presentation	1	PHYS 3120 Advanced Classical Mechanics	3
THEO 1000 Theological Foundations	3	PHYS 4010 Nanoscience and Nanofabrication Frontiers	3
PHIL 2050 Ethics		PHYS 4020 Experimental Physics	3
PHIL 3400 Ethics & Engineering	3	PHYS 4220 Electricity & Magnetism II	
	3	PHYS 4620 Application of Quantum Mechanics	3
Social/Behavioral Science Elective	3	PHYS 4930 Special Topics (Selected with mentor)	3
Humanities Elective	3		
Cultural Diversity Elective	3	Complete Two of the Following Two-Course Sequences:	
		Transport	
		BME 3300 Transport Fundamentals	3

BME 4300 Biotransport	3		
Materials Science		Engineering Physics & Engineering Topics (53 credit	ts)
BME 3400 Materials Science	3	CSCI 1060 Intro.to CS: Scientific Programming	3
BME 4400 Biomaterials	3	ECE 2101 Engineering Circuits I	3
Measurements		ECE 2102 Engineering Circuits II	3
BME 3050 Measurements	3	ECE 2103 Electrical Science Lab	1
And one of the following two courses:	_	ECE 2205/2206 Digital Design/Lab	4
BME 3150 Biomedical Instrumentation	3	ECE 3130 Semiconductor Devices	3
BME 4600 Quantitative Physiology I	3	ECE 3130 Semiconductor Devices ECE 3140 Electromagnetic Fields	
Diffe 1000 Quantitative injuriology i	J		3
Signals & Systems		ECE 3215/3216 Computer Systems Design/Lab	4
BME 3100 Signals	2	ECE 3225/3226 Microprocessors/Lab	4
<u> </u>	3	Two Engineering Electives selected with mentor	6
BME 4100 Biomedical Signals	3	PHYS 3310/3320 Optics/Lab PHYS 3410 Thermodynamics& Statistical Mechanics	4 3
Senior Design Project		11113 3410 Thermodynamics& Statistical Mechanics	3
BME 4950 Senior Project I	3	Two Engineering Physics Electives Selected From:	
BME 4960 Senior Project II	3	PHYS 3120 Advanced Classical Mechanics	3
J		PHYS 4010 Nanoscience and Nanofabrication Frontiers	3
College Core (22 credits)		PHYS 4020 Experimental Physics	3
	2	PHYS 4220 Electricity & Magnetism II	3
ENGL 1900 Adv. Rhet. & Research or 1920 Adv. Writing	3		
CMM 2200 Small Group Presentation	1	PHYS 4620 Application of Quantum Mechanics	3
THEO 1000 Theological Foundations	3	PHYS 4930 Special Topics (Selected with mentor)	3
PHIL 2050 Ethics	3		
PHIL 3400 Ethics & Engineering	3	Senior Design Project	
Social/Behavioral Science Elective	3	ECE 4800 Electrical Engineering Design I	3
Humanities Elective	3	ECE 4810 Electrical Engineering Design II	3
Cultural Diversity Elective	3		
C k 1D; 's H 's' 10 : 1/D l : 10 :		College Core (22 credits)	_
Cultural Diversity, Humanities, and Social/Behavioral Scien		ENGL 1900 Adv. Rhet. & Research or 1920 Adv. Writing	3
elective courses must be selected from an approved list. See		CMM 2200 Small Group Presentation	1
Parks College introduction in this catalog for more informat	ion.	THEO 1000 Theological Foundations	3
		PHIL 2050 Ethics	3
Concentration in Computer Engineering		PHIL 3400 Ethics & Engineering	3
concentration in compater Engineering		Social/Behavioral Science Elective	3
Duefaccional Orientation (1 l'4 l' l)		Humanities Elective	3
Professional Orientation (1 credit required)		Cultural Diversity Elective	3
Selected from the following:	1	·	
PHYS 1110 Introduction to Physics (as a career)	1	Cultural Diversity, Humanities, and Social/Behavioral Scien	ıce
AENG/MENG 1001 Introduction to AE & ME	1	elective courses must be selected from an approved list. See	_
BME 1000 Biomedical Engineering Orientation	1	Parks College introduction in this catalog for more informat	
ECE 1001 Introduction to ECE	1	Tarks conege introduction in this eatting for more informati	.1011.
Pasia Sajanaa & Mathamatics (16 analita)		Open Electives (6 credits)	
Basic Science & Mathematics (46 credits)	4	Two Courses	6
CHEM1110/1115 General Chemistry I/Lab	4		
MATH1510 Calculus I	4		
MATH1520 Calculus II	4		
MATH2530 Calculus III	4		
MATH3550 Differential Equations I	3		
MATH3270 Advanced Mathematics for Engineers	3		
MATH3240 Numerical Analysis	3	Concentration in Electrical Engineering	
MATH3850 Foundations of Statistics	3	Conconduction in Dicoutout Dispireding	
PHYS 1610/1620 Engineering Physics I/Lab	4	Duefersianal Orientation (1 12 12 12 12	
PHYS 1630/1640 Engineering Physics II/Lab	4	Professional Orientation (1 credit required)	
PHYS 2610/2620 Modern Physics/Lab	4	Selected from the following:	
PHYS 3110 Classical Mechanics	3	PHYS 1110 Introduction to Physics (as a career)	1
PHYS 4610 Quantum Mechanics	3	AENG/MENG 1001 Introduction to AE & ME	1

BME 1000 Biomedical Engineering Orientation ECE 1001 Introduction to ECE	1 1	ECE 4800 Electrical Engineering Design I ECE 4810 Electrical Engineering Design II	3
Basic Science & Mathematics (46 credits)		College Core (22 credits)	
CHEM1110/1115 General Chemistry I/Lab	4	ENGL 1900 Adv. Rhet. & Research or 1920 Adv. Writing	3
MATH1510 Calculus I	4	CMM 2200 Small Group Presentation	1
MATH1520 Calculus II	4	THEO 1000 Theological Foundations	3
MATH2530 Calculus III	4	PHIL 2050 Ethics	3
MATH3550 Differential Equations I	3	PHIL 3400 Ethics & Engineering	3
MATH3270 Advanced Mathematics for Engineers	3	Social/Behavioral Science Elective	3
MATH3240 Numerical Analysis	3	Humanities Elective	3
MATH3850 Foundations of Statistics	3	Cultural Diversity Elective	3
PHYS 1610/1620 Engineering Physics I/Lab	4		
PHYS 1630/1640 Engineering Physics II/Lab	4	Cultural Diversity, Humanities, and Social/Behavioral Science	ce
PHYS 2610/2620 Modern Physics/Lab	4	elective courses must be selected from an approved list. See	
PHYS 3110 Classical Mechanics	3	Parks College introduction in this catalog for more informati	
PHYS 4610 Quantum Mechanics	3		
`		Open Electives (6 credits)	
Engineering Physics & Engineering Topics (50-51 cm	edits)	Two Courses	6
CSCI 1060 Intro. to CS: Scientific Programming	3		
ECE 2101 Engineering Circuits I	3	Concentration in Mechanical Engineering	
ECE 2102 Engineering Circuits II	3	Concentration in Mechanical Engineering	
ECE 2103 Electrical Science Lab	1		
ECE 3130 Semiconductor Devices	3	Professional Orientation (1creditrequired)	
ECE 3140 Electromagnetic Fields	3	Selected from the following:	
PHYS 3310/3320 Optics/Lab	4	PHYS 1110 Introduction to Physics (as a career)	1
PHYS 3410 Thermodynamics& Statistical Mechanics	3	AENG/MENG 1001 Introduction to AE & ME	l
,		BME 1000 Biomedical Engineering Orientation	l
Two Engineering Physics Electives Selected From:		ECE 1001 Introduction to ECE	1
PHYS 3120 Advanced Classical Mechanics	3	(It is recommended that students in this concentration take P	HYS
PHYS 4010 Nanoscience and Nanofabrication Frontiers	3	1110 & MENG 1001)	
PHYS 4020 Experimental Physics	3		
PHYS 4220 Electricity & Magnetism II	3	Basic Science & Mathematics (43 credits)	
PHYS 4620 Application of Quantum Mechanics	3	CHEM1110/1115 General Chemistry I/Lab	4
PHYS 4930 Special Topics (Selected with mentor)	3	MATH1510 Calculus I	4
		MATH1520 Calculus II	4
One of the Following Three Tracks:		MATH2530 Calculus III	4
Track 1 Electromagnetic Fields and Waves		MATH3550 Differential Equations I	3
ECE 3110 Electric Energy Conversion	3	MATH3270 Advanced Mathematics for Engineers	3
ECE 4160 Communication Systems	3	MATH3240 Numerical Analysis	3
ECE 4140 Electromagnetic Waves	3	MATH3850 Foundations of Statistics	3
Two Engineering Electives selected with advisor	6	PHYS 1610/1620 Engineering Physics I/Lab	4
Track 2 Analog Electronics		PHYS 1630/1640 Engineering Physics II/Lab	4
ECE 3150 Linear Systems	3	PHYS 2610/2620 Modern Physics/Lab	4
ECE 3131/3132 Electronic Circuit Design/Lab	4	PHYS 4610 Quantum Mechanics	3
ECE 4120 Automatic Control Systems	3		
Two Engineering Electives selected with mentor	6	Engineering Physics & Engineering Topics (59 credits	· _
		AENG 3100 Computer Aided Engineering	3
		CSCI 1060 Intro.to CS: Scientific Programming	3
Track 3 Communications		MENG1002 Computer-Aided Engineering Design	1
ECE 2205/2206 Digital Design/Lab	4	ESCI 2100 Statics	3
ECE 3150 Linear Systems	3	ESCI 2150 Dynamics	3
ECE 4160 Communication Systems	3	ESCI 2300 Thermodynamics	3
Two Engineering Electives selected with mentor	6	ESCI 3100/3101 Mechanics of Solids/Lab	4
		ESCI 3200/3201 Fluid Dynamics/Lab	4
Senior Design Project		ESCI 3110 Linear Vibrations	3

MENG2000 Foundations of Engineering Design	3	MATH3240 Numerical Analysis	3
MENG3010 Machine Design	3	MATH3850 Foundations of Statistics	3
Upper Div. Engineering Course (MENG/ESCI 3xxx, 4xx	x) 3	PHYS 1610/1620 Engineering Physics I/Lab	4
PHYS 3310/3320 Optics/Lab	4	PHYS 1630/1640 Engineering Physics II/Lab	4
PHYS 3510 Analog & Digital Electronics/Lab	4	PHYS 2610/2620 Modern Physics/Lab	4
PHYS 4210 Electricity & Magnetism I	3	PHYS 4610 Quantum Mechanics	3
Two Engineering Physics Electives Selected From:		Engineering Physics & Engineering Topics (50 cred	its)
PHYS 3120 Advanced Classical Mechanics	3		,
PHYS 4010 Nanoscience and Nanofabrication Frontiers		Engineering Breadth	
PHYS 4020 Experimental Physics	3	Engineering Mechanics – One of the following options	
PHYS 4220 Electricity & Magnetism II	3	BME 3200 Mechanics	3
PHYS 4620 Application of Quantum Mechanics	3	BME 4200 Biomechanics	3
PHYS 4930 Special Topics (Selected with mentor)	3	or	
,		ESCI 2100 Statics	3
Senior Design Project		ESCI 2150 Dynamics	3
MENG4004 Design I	3		
MENG4014 Design II	3	Computation – One of the following options	
5		BME 2000 Biomedical Engineering Computing	3
College Core (22 credits)		CSCI 1060 Intro.to CS: Scientific Programming	3
ENGL 1900 Adv. Rhet. & Research or 1920 Adv. Writin	g 3		
CMM 2200 Small Group Presentation	1	Thermodynamics – One of the following options	
THEO 1000 Theological Foundations	3	PHYS 3410 Thermodynamics& Statistical Mechanics	3
PHIL 2050 Ethics	3	ESCI 2300 Thermodynamics	3
PHIL 3400 Ethics & Engineering	3		
Social/Behavioral Science Elective	3	Electricity & Magnetism	
Humanities Elective	3	PHYS 4210 Electricity & Magnetism I	3
Cultural Diversity Elective	3	And one of the following options:	
Cultural Diversity Dicetive	3	ECE 2001/2002 Intro. to ECE/Lab	4
Cultural Diversity, Humanities, and Social/Behavioral Sc	ience	PHYS 3510 Analog & Digital Electronics/Lab	4
elective courses must be selected from an approved list. S			
Parks College introduction in this catalog for more inform		Optics	
Tarks conege introduction in this catalog for more inform	iution.	PHYS 3310/3320 Optics/Lab	4
Open Elective (3 credits)		And two courses out of the following three Engineering	
One course 3		Breadth Areas:	
		Materials Science – One of the following options	
Interdisciplinary Option		BME 3400 Materials Science	3
		ESCI 3100 Mechanics of Solids	3
Professional Orientation (1 creditrequired)		Transport/Fluids – One of the following options	
Selected from the following:		BME 3300 Transport Fundamentals	3
PHYS 1110 Introduction to Physics (as a career)	1	ESCI 3200 Fluid Dynamics	3
AENG/MENG 1001 Introduction to AE & ME	1	Signals/Systems – One of the following options	
BME 1000 Biomedical Engineering Orientation	1	BME 3100 Signals	3
ECE 1001 Introduction to ECE	1	ECE 3150 Linear Systems	3
Basic Science & Mathematics (55 credits)		Engineering Depth	
CHEM 1110/1115 General Chemistry I/Lab	4	Focus Area:	
CHEM 1120/1125 General Chemistry II/Lab	4	Three Upper Division Engineering Courses	9
BIOL 1240/1245 Principles of Biology I/Lab	4	Two Engineering Physics Electives Selected From:	
BIOL 1260/1265 Principles of Biology II/Lab	4	PHYS 3120 Advanced Classical Mechanics	3
MATH1510 Calculus I	4	PHYS 4010 Nanoscience and Nanofabrication Frontiers	3
MATH1510 Calculus II	4	PHYS 4020 Experimental Physics	3
MATH2530 Calculus III	4	PHYS 4220 Electricity & Magnetism II	3
MATH3550 Calculus III MATH3550 Differential Equations I	3	PHYS 4620 Application of Quantum Mechanics	3
MATH3330 Differential Equations 1 MATH3270 Advanced Mathematics for Engineers	3	PHYS 4930 Special Topics (Selected with mentor)	3
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Senior Design Project Two Course Sequence

Two Course Sequence	6
College Core (22 credits)	
ENGL 1900 Adv. Rhet. & Research or 1920 Adv. Writing	3
CMM 2200 Small Group Presentation	1
THEO 1000 Theological Foundations	3
PHIL 2050 Ethics	3
PHIL 3400 Ethics & Engineering	3
Social/Behavioral Science Elective	3
Humanities Elective	3
Cultural Diversity Elective	3

Cultural Diversity, Humanities, and Social/Behavioral Science elective courses must be selected from an approved list. See the Parks College introduction in this catalog for more information.