

# B.S. in Optical Sciences and Engineering

## Four-Year Plan

### Catalog Year 2014-2015

Below is the *advised sequence* of courses for this degree program.

The official degree requirements can be found in the University General Catalog.

Optics Track		
Course Number and Title	Units	Prerequisites
<b>1<sup>ST</sup> SEMESTER</b>		
MATH 122A/B or MATH 125 Calculus I with Applications	5/3	Appropriate Math Placement
CHEM 151 General Chemistry I	4	
ENGL 101 First-Year Composition	3	
ENGR 102 Introduction to Engineering Or ENGR 102A and ENGR 102B	3	Concurrent enrollment or completion of MATH 122B or MATH 125
Tier I General Education	3	
<b>2<sup>ND</sup> SEMESTER</b>		
MATH 129 Calculus II	3	MATH 122B or 125 with C or better
MSE 110 Solid State Chemistry	4	CHEM 151
PHYS 141 Introductory Mechanics	4	MATH 122B or MATH 125; Concurrent enrollment in MATH 129
ENGL 102 First-Year Composition	3	ENGL 101
Tier I General Education	3	
<b>3<sup>RD</sup> SEMESTER</b>		
OPTI 201R Geometrical & Instrumental Optics I (Fall Only)	3	MATH 129, PHYS 141, MSE 110
OPTI 201L Geometrical & Instrumental Optics Lab I (Fall Only)	1	Concurrent enrollment in OPTI 201R
MATH 223 Vector Calculus	4	MATH 129 with a C or better
PHYS 241 Introductory Electricity and Magnetism	4	PHYS 141
Tech Elective	3	
<b>4<sup>TH</sup> SEMESTER</b>		
OPTI 202R Geometrical and Instrumental Optics II (Spr. Only)	3	OPTI 201R
OPTI 202L Geometrical and Instrumental Optics Lab II (Spring Only)	1	Concurrent enrollment in OPTI 202R
OPTI 280 Computer Programming (Spring Only)	1	
OPTI 240 Semiconductor Physics and Lasers	3	PHYS 241; Concurrent enrollment MATH 254
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 with C or better
ECE 220 or ECE 207	5/3	MATH 129; PHYS 241; Concurrent enrollment MATH 254

Course Number and Title	Units	Prerequisites
<b>Advanced Standing is required for 3xx and 4xx courses (See advisor for requirements)</b>		
<b>5<sup>TH</sup> SEMESTER</b>		
OPTI 310 Physical Optics I (Fall Only)	3	MATH 223; MATH 254; PHYS 241; OPTI 280
OPTI 380A Intermediate Optics Laboratory I (Fall Only)	1	Concurrent enrollment in OPTI 310
Math 322 Mathematical Analysis for Engineers	3	MATH 254
Technical Elective	3	
Technical Elective	3	
Tier II General Education	3	
<b>6<sup>TH</sup> SEMESTER</b>		
OPTI 330 Physical Optics II (Spring Only)	3	OPTI 310
OPTI 340 Optical Design (Spring Only)	3	OPTI 201R, OPTI 201L, OPTI 202R, OPTI 202L, OPTI 310
OPTI 370 Laser and Photonics (Spring Only)	3	OPTI 240; OPTI 310
OPTI 380B Intermediate Optics Laboratory II (Spring Only)	1	Concurrent enrollment OPTI 330, OPTI 340, ECE 207 or 220
Technical Elective	3	
Tier II General Education	3	
<b>7<sup>TH</sup> SEMESTER</b>		
OPTI 406 Radiometry, Sources and Detectors (Fall Only)	3	OPTI 201R; OPTI 201L; OPTI 380B; ECE 207 or ECE 220 or OPTI 360
OPTI 430 Optical Communication Systems (Fall Only)	3	ECE 207 or 220; OPTI 380A; OPTI 380B
ENGR 498A Cross-disciplinary Design (Fall Only)	3	Senior status
OPTI 421 Introductory Optomechanical Engineering (Fall Only)	3	
OPTI 471A Advanced Optics Laboratory	2	OPTI 330; OPTI 370; ECE 207 or ECE 220 Concurrent enrollment in OPTI 406
Technical Elective	3	
<b>8<sup>TH</sup> SEMESTER</b>		
ENGR 498B Cross-disciplinary Design (Spring Only)	3	Senior status
OPTI 415 Optical Specifications, Fabrication, and Testing (Spring Only)	3	OPTI 330; OPTI 340; OPTI 201 R/L; OPTI 202R/L; OPTI 310
OPTI 471B Advanced Optics Laboratory	2	OPTI 471A
Technical Elective	3	
Tier I General Education	3	
Tier I General Education	3	

\*Tier I and II General Education Courses must meet University general education requirements. One course must be recognized by the university as meeting the Diversity Requirement.

# Opto-Materials Track

Course Number and Title	Units	Prerequisites
<b>1<sup>ST</sup> SEMESTER</b>		
MATH 122A/B or MATH 125 Calculus I with Applications	5/3	Appropriate Math Placement
CHEM 151 General Chemistry I	4	
ENGL 101 First-Year Composition	3	
ENGR 102 Introduction to Engineering Or ENGR 102A and ENGR 102B	3	Concurrent enrollment or completion of MATH 122B or MATH 125
Tier I General Education	3	
<b>2<sup>ND</sup> SEMESTER</b>		
MATH 129 Calculus II	3	MATH 122B or 125 with C or better
MSE 110 Solid State Chemistry	4	CHEM 151
PHYS 141 Introductory Mechanics	4	MATH 122B or MATH 125; Concurrent enrollment in MATH 129
ENGL 102 First-Year Composition	3	ENGL 101
Tier I General Education	3	
<b>3<sup>RD</sup> SEMESTER</b>		
OPTI 201R Geometrical & Instrumental Optics I (Fall Only)	3	MATH 129, PHYS 141, MSE 110
OPTI 201L Geometrical & Instrumental Optics Lab I (Fall Only)	1	Concurrent enrollment in OPTI 201R
MATH 223 Vector Calculus	4	MATH 129 with a C or better
PHYS 241 Introductory Electricity and Magnetism	4	PHYS 141
MSE 345 Thermodynamics	4	MATH 129; CHEM 151
<b>4<sup>TH</sup> SEMESTER</b>		
OPTI 202R Geometrical and Instrumental Optics II (Spring Only)	3	OPTI 201R
OPTI 202L Geometrical and Instrumental Optics Lab II (Spring Only)	1	Concurrent enrollment in OPTI 202R
OPTI 280 Computer Programming (Spring Only)	1	
OPTI 240 Semiconductor Physics and Lasers	3	PHYS 241; Concurrent enrollment with MATH 254
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 with C or better
MSE 365 Structure and Properties of Materials I	4	

Course Number and Title	Units	Prerequisites
<b>Advanced Standing is required for 3xx and 4xx courses (See advisor for requirements)</b>		
<b>5<sup>TH</sup> SEMESTER</b>		
OPTI 310 Physical Optics I (Fall Only)	3	MATH 223; MATH 254; PHYS 241; OPTI 280
OPTI 380A Intermediate Optics Laboratory I (Fall Only)	1	Concurrent enrollment in OPTI 310
Math 322 Mathematical Analysis for Engineers	3	MATH 254
ECE 207 Elements of Electrical Engineering or ECE 220 Basic Circuits	3/5	MATH 129; PHYS 241, concurrent enrollment MATH 254
MSE 434 Electrical and Optical Properties of Materials	3	PHYS 241
Tier I General Education	3	
<b>6<sup>TH</sup> SEMESTER</b>		
OPTI 330 Physical Optics II (Spring Only)	3	OPTI 310
OPTI 340 Optical Design (Spring Only)	3	OPTI 201R, OPTI 201L, OPTI 202R, OPTI 202L, OPTI 310
OPTI 370 Laser and Photonics (Spring Only)	3	OPTI 240; OPTI 310
OPTI 380B Intermediate Optics Laboratory II (Spring Only)	1	Concurrent enrollment OPTI 330, OPTI 340, ECE 207 or 220
MSE 480 Experimental Methods for Microstructural Analysis	3	
Tier II General Education	3	
<b>7<sup>TH</sup> SEMESTER</b>		
OPTI 406 Radiometry, Sources and Detectors (Fall Only)	3	OPTI 201R; OPTI 201L; OPTI 380B; ECE 207 or ECE 220 or OPTI 360
OPTI 430 Optical Communication Systems (Fall Only)	3	ECE 207 or 220; OPTI 380A; OPTI 380B
ENGR 498A Cross-disciplinary Design (Fall Only)	3	Senior status
OPTI 421 Introductory Optomechanical Engineering (Fall Only)	3	
OPTI 471A Advanced Optics Laboratory	2	OPTI 330; OPTI 370; ECE 207 or ECE 220 Concurrent enrollment in OPTI 406
MSE Technical Elective	1	
<b>8<sup>TH</sup> SEMESTER</b>		
ENGR 498B Cross-disciplinary Design (Spring Only)	3	Senior status
OPTI 415 Optical Specifications, Fabrication, and Testing (Spring Only)	3	OPTI 330; OPTI 340; OPTI 201R/L, OPTI 202R/L, OPTI 310
OPTI 471B Advanced Optics Laboratory (Spring Only)	2	OPTI 471A
MSE Technical Elective	3	
Tier I General Education	3	
Tier II General Education	3	

\*Tier I and II General Education Courses must meet University general education requirements. One course must be recognized by the university as meeting the Diversity Requirement.



## Opto-Electronics Track

Course Number and Title	Units	Prerequisites
<b>1<sup>ST</sup> SEMESTER</b>		
MATH 122A/B or MATH 125 Calculus I with Applications	5/3	Appropriate Math Placement
CHEM 151 General Chemistry I	4	
ENGL 101 First-Year Composition	3	
ENGR 102 Introduction to Engineering Or ENGR 102A and ENGR 102B	3	Concurrent enrollment or completion of MATH 122B or MATH 125
Tier I General Education	3	
<b>2<sup>ND</sup> SEMESTER</b>		
MATH 129 Calculus II	3	MATH 122B or 125 with C or better
MSE 110 Solid State Chemistry	4	CHEM 151
PHYS 141 Introductory Mechanics	4	MATH 122B or MATH 125; Concurrent enrollment in MATH 129
ENGL 102 First-Year Composition	3	ENGL 101
Tier I General Education	3	
<b>3<sup>RD</sup> SEMESTER</b>		
OPTI 201R Geometrical & Instrumental Optics I (Fall Only)	3	MATH 129, PHYS 141, MSE 110
OPTI 201L Geometrical & Instrumental Optics Lab I (Fall Only)	1	Concurrent enrollment in OPTI 201R,
MATH 223 Vector Calculus	4	MATH 129 with a C or better
PHYS 241 Introductory Electricity and Magnetism	4	PHYS 141
ECE 274A Digital Logic	4	Completion or Concurrent enrollment PHYS 241 and MATH 129
<b>4<sup>TH</sup> SEMESTER</b>		
OPTI 202R Geometrical and Instrumental Optics II (Spring Only)	3	OPTI 201R
OPTI 202L Geometrical and Instrumental Optics Lab II (Spring Only)	1	Concurrent enrollment in OPTI 202R
OPTI 280 Computer Programming (Spring Only)	1	
OPTI 240 Semiconductor Physics and Lasers (Spring Only)	3	PHYS 241, Concurrent enrollment in MATH 254
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 with C or better
ECE 220 Basic Circuits	5	MATH 129; PHYS 241, concurrent enrollment MATH 254

Course Number and Title	Units	Prerequisites
<b>Advanced Standing is required for 3xx and 4xx courses (See advisor for requirements)</b>		
<b>5<sup>TH</sup> SEMESTER</b>		
OPTI 310 Physical Optics I (Fall Only)	3	MATH 223; MATH 254; PHYS 241; OPTI 280
OPTI 380A Intermediate Optics Laboratory I (Fall Only)	1	Concurrent enrollment in OPTI 310
Math 322 Mathematical Analysis for Engineers	3	MATH 254
ECE Technical Elective	3	
Tier I General Education	3	
Tier II General Education	3	
<b>6<sup>TH</sup> SEMESTER</b>		
OPTI 330 Physical Optics II (Spring Only)	3	OPTI 310
OPTI 340 Optical Design (Spring Only)	3	OPTI 201R, OPTI 201L, OPTI 202R, OPTI 202L, OPTI 310
OPTI 370 Laser and Photonics (Spring Only)	3	OPTI 240; OPTI 310
OPTI 380B Intermediate Optics Laboratory II (Spring Only)	1	Concurrent enrollment OPTI 330, OPTI 340, ECE 207 or 220
ECE 381A Introductory Electromagnetics	4	MATH 223
Tier II General Education	3	
<b>7<sup>TH</sup> SEMESTER</b>		
OPTI 406 Radiometry, Sources and Detectors (Fall Only)	3	OPTI 201R; OPTI 201L; OPTI 380B; ECE 207 or ECE 220 or OPTI 360
OPTI 430 Optical Communication Systems (Fall Only)	3	ECE 207 or 220; OPTI 380A; OPTI 380B
ENGR 498A Cross-disciplinary Design (Fall Only)	3	Senior status
OPTI 421 Introductory Optomechanical Engineering (Fall Only)	3	
OPTI 471A Advanced Optics Laboratory (Fall Only)	2	OPTI 330; OPTI 370; ECE 207 or ECE 220 Concurrent enrollment in OPTI 406
ECE Technical Elective	2	
<b>8<sup>TH</sup> SEMESTER</b>		
ENGR 498B Cross-disciplinary Design (Spring Only)	3	Senior status
OPTI 415 Optical Specifications, Fabrication, and Testing (Spring Only)	3	OPTI 330; OPTI 340; OPTI 201R/L; OPTI 202R/L; OPTI 310
OPTI 471B Advanced Optics Laboratory (Spring Only)	2	OPTI 471A
Technical Elective	3	
Tier I General Education	3	

\*Tier I and II General Education Courses must meet University general education requirements. One course must be recognized by the university as meeting the Diversity Requirement.

## Opto-Mechanics Track

Course Number and Title	Units	Prerequisites
<b>1<sup>ST</sup> SEMESTER</b>		
MATH 122A/B or MATH 125 Calculus I with Applications	5/3	Appropriate Math Placement
CHEM 151 General Chemistry I	4	
ENGL 101 First-Year Composition	3	
ENGR 102 Introduction to Engineering Or ENGR 102A and ENGR 102B	3	Concurrent enrollment or completion of MATH 122B or MATH 125
Tier I General Education	3	
<b>2<sup>ND</sup> SEMESTER</b>		
MATH 129 Calculus II	3	MATH 122B or 125 with C or better
MSE 110 Solid State Chemistry	4	CHEM 151
PHYS 141 Introductory Mechanics	4	MATH 122B or MATH 125; Concurrent enrollment in MATH 129
ENGL 102 First-Year Composition	3	ENGL 101
Tier I General Education	3	
<b>3<sup>RD</sup> SEMESTER</b>		
OPTI 201R Geometrical & Instrumental Optics I (Fall Only)	3	MATH 129, PHYS 141, MSE 110
OPTI 201L Geometrical & Instrumental Optics Lab I (Fall Only)	1	Concurrent enrollment in OPTI 201R
MATH 223 Vector Calculus	4	MATH 129 with a C or better
PHYS 241 Introductory Electricity and Magnetism	4	PHYS 141
CE 214 Statics	3	PHYS 141; MATH 129
<b>4<sup>TH</sup> SEMESTER</b>		
OPTI 202R Geometrical and Instrumental Optics II (Spring Only)	3	OPTI 201R
OPTI 202L Geometrical and Instrumental Optics Lab II (Spring Only)	1	Concurrent enrollment in OPTI 202R
OPTI 280 Computer Programming (Spring Only)	1	
OPTI 240 Semiconductor Physics and Lasers (Spring Only)	3	PHYS 241, Concurrent enrollment in MATH 254
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 with C or better
AME 250 Dynamics	3	CE 214; Concurrent enrollment MATH 254
Tier I General Education	3	



Course Number and Title	Units	Prerequisites
<b>Advanced Standing is required for 3xx and 4xx courses (See advisor for requirements)</b>		
<b>5<sup>TH</sup> SEMESTER</b>		
OPTI 310 Physical Optics I (Fall Only)	3	MATH 223; MATH 254; PHYS 241; OPTI 280
OPTI 380A Intermediate Optics Laboratory I (Fall Only)	1	Concurrent enrollment in OPTI 310
Math 322 Mathematical Analysis for Engineers	3	MATH 254
ECE 207 Elements of Electrical Engineering or ECE 220 Basic Circuits	3/5	MATH 129; PHYS 241, concurrent enrollment MATH 254
AME 324A Mechanical Behavior of Engineering Materials	3	CE 214
Tier II General Education	3	
<b>6<sup>TH</sup> SEMESTER</b>		
OPTI 330 Physical Optics II (Spring Only)	3	OPTI 310
OPTI 340 Optical Design (Spring Only)	3	OPTI 201R, OPTI 201L, OPTI 202R, OPTI 202L, OPTI 310
OPTI 370 Laser and Photonics (Spring Only)	3	OPTI 240; OPTI 310
OPTI 380B Intermediate Optics Laboratory II (Spring Only)	1	Concurrent enrollment OPTI 330, OPTI 340, ECE 207 or 220
AME 324B Engineering Component Design	3	AME 324A
Tier II General Education	3	
<b>7<sup>TH</sup> SEMESTER</b>		
OPTI 406 Radiometry, Sources and Detectors (Fall Only)	3	OPTI 201R; OPTI 201L; OPTI 380B; ECE 207 or ECE 220 or OPTI 360
OPTI 430 Optical Communication Systems (Fall Only)	3	ECE 207 or 220; OPTI 380A; OPTI 380B
ENGR 498A Cross-disciplinary Design (Fall Only)	3	Senior status
OPTI 421 Introductory Optomechanical Engineering (Fall Only)	3	
OPTI 471A Advanced Optics Laboratory (Fall Only)	2	OPTI 330; OPTI 370; ECE 207 or ECE 220 Concurrent enrollment in OPTI 406
AME Technical Elective	3	300/400 level
<b>8<sup>TH</sup> SEMESTER</b>		
ENGR 498B Cross-disciplinary Design (Spring Only)	3	Senior status
OPTI 415 Optical Specifications, Fabrication, and Testing (Spring Only)	3	OPTI 330; OPTI 340; OPTI 201R/L; OPTI 202R/L; OPTI 310
OPTI 471B Advanced Optics Laboratory (Spring Only)	2	OPTI 471A
AME Technical Elective	3	300/400 level
Tier I General Education	3	

\*Tier I and II General Education Courses must meet University general education requirements. One course must be recognized by the university as meeting the Diversity Requirement.