

# B.S. IN OPTICAL SCIENCES & ENGINEERING

## CATALOG YEAR 2018-2019

Below is the *advised sequence* of courses for this degree program and prerequisites as of 2/08/18.  
The official degree requirements and prerequisites can be found in the University General Catalog and the prerequisites are subject to change.

### 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 or CHEM 105A/106A	4	Appropriate Math Placement
ENGL 101 or 107 or 109H First-Year Composition	3	
ENGR 102A/B Introduction to Engineering or ENGR 102	3	Concurrent enrollment or completion of MATH 122B or 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 or 105A/106A
PHYS 141 Introductory Mechanics or PHYS 161H	4	MATH 122B or 125
ENGL 102 or 108 First-Year Composition	3	ENGL 101 or ENGL 107
Tier I General Education	3	
<b>3<sup>RD</sup> SEMESTER</b>		
OPTI 201R Geometrical & Instrumental Optics I (Fall Only)	3	MATH 122B or 125, 129, PHYS 141 or 161H, MSE 110
OPTI 201L Geometrical & Instrumental Optics Lab I (Fall Only)	1	Concurrent enrollment or completion of OPTI 201R
MATH 223 Vector Calculus	4	MATH 129 with a C or better
PHYS 241 Introductory Electricity and Magnetism or PHYS 261H	4	For PHYS 241 or 261H: PHYS 141 or 161H; MATH 129
Tier I General Education	3	
Technical Elective - See advisor for course approval	3	
<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	OPTI 201R; Concurrent enrollment or completion of OPTI 202R
OPTI 280 Computer Programming (Spring Only)	1	Major: OSE
OPTI 210 Physics Optics I (Spring Only) – <b>SEE ADVISOR</b> for registration and enrollment requirements	3	
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 or 223 with C or better
Tier I General Education	3	
ECE 207 Elements of Electrical Engineering or ECE 220 Basic Circuits	3/5	ECE 207: PHYS 241 or 261H; ECE 220 MATH 129 and PHYS 241 or 261H

\*Grade of 'C' or better is required for all OSE curriculum except General Education classes.

## OPTICS TRACK

COURSE NUMBER AND TITLE	UNITS	
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**CURRENT PREREQUISITES FOR UPPER DIVISION COURSES CAN BE FOUND IN THE UA GENERAL CATALOG**

**ADVANCED STANDING IS REQUIRED FOR 3XX AND 4XX COURSES (SEE ADVISOR FOR REQUIREMENTS)**

### 5<sup>TH</sup> SEMESTER

OPTI 341 Semiconductor Physics & Lasers (Fall Only)	3	
OPTI 380A Intermediate Optics Laboratory I (Fall Only)	1	
MATH 322 Mathematical Analysis for Engineers	3	
Technical Elective - See major advisor for course approval	3	
OPTI 306 Radiometry, Sources and Detectors (Fall Only)	3	
Tier II General Education	3	

### 6<sup>TH</sup> SEMESTER

OPTI 330 Physical Optics II (Spring Only)	3	
OPTI 340 Optical Design (Spring Only)	3	
OPTI 370 Laser and Photonics (Spring Only)	3	
OPTI 380B Intermediate Optics Laboratory II (Spring Only)	1	
Technical Elective – See major advisor for course approval	3	
Tier II General Education	3	

### 7<sup>TH</sup> SEMESTER

ENGR 498A Cross-disciplinary Design (Fall Only) – Senior Status	3	
Technical Elective – See major advisor for course approval	3	
OPTI 430 Optical Communication Systems (Fall Only)	3	
OPTI 421 Introductory Optomechanical Engineering (Fall Only)	3	
OPTI 471A Advanced Optics Laboratory (Fall Only)	2	

### 8<sup>TH</sup> SEMESTER

ENGR 498B Cross-disciplinary Design (Spring Only) – Senior Status	3	
OPTI 415 Optical Specifications, Fabrication and Testing (Spring Only)	3	
OPTI 471B Advanced Optics Laboratory (Spring Only)	2	
Technical Elective - See major advisor for course approval	3	
Technical Elective - See major advisor for course approval	3	

\*Grade of 'C' or better is required for all OSE curriculum except General Education classes.

\*\*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
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### 1<sup>ST</sup> SEMESTER

## OPTO-MATERIALS TRACK

COURSE NUMBER AND TITLE	UNITS	PREREQUISITES
MATH 122A/B or MATH 125 Calculus I with Applications	5/3	Appropriate Math Placement
CHEM 151 General Chemistry I or CHEM 105A/106A	4	Appropriate Math Placement
ENGL 101 or 107 or 109H First-Year Composition	3	
ENGR 102A/B Introduction to Engineering or ENGR 102	3	Concurrent enrollment or completion of MATH 122B or 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 or 105A/106A
PHYS 141 Introductory Mechanics or PHYS 161H	4	MATH 122B or 125
ENGL 102 or 108 First-Year Composition	3	ENGL 101 or ENGL 107
Tier I General Education	3	
<b>3<sup>RD</sup> SEMESTER</b>		
OPTI 201R Geometrical & Instrumental Optics I (Fall Only)	3	MATH 122B or 125, 129, PHYS 141 or 161H, MSE 110
OPTI 201L Geometrical & Instrumental Optics Lab I (Fall Only)	1	Concurrent enrollment or completion of OPTI 201R
MATH 223 Vector Calculus	4	MATH 129 with a C or better
PHYS 241 Introductory Electricity and Magnetism or PHYS 261H	4	For PHYS 241 or 261H: PHYS 141 or 161H; MATH 129
Tier I General Education	3	
<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	OPTI 201R; Concurrent enrollment or completion of OPTI 202R
OPTI 280 Computer Programming (Spring Only)	1	Major: OSE
OPTI 310 Physics Optics I (Spring Only) – See advisor for registration	3	Adv Stdg: Engineering; MATH 223, 254, PHYS241, OPTI 280
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 or 223 with C or better
MSE 345 Thermodynamics (Spring Only)	4	Recommend MATH 129, CHEM 151
Tier 1 General Education	3	

\*Grade of 'C' or better is required for all OSE curriculum except General Education classes.

## OPTO-MATERIALS TRACK

COURSE NUMBER AND TITLE	UNITS	
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**CURRENT PREREQUISITES FOR UPPER DIVISION COURSES CAN BE FOUND IN THE UA GENERAL CATALOG**

**ADVANCED STANDING IS REQUIRED FOR 3XX AND 4XX COURSES (SEE ADVISOR FOR REQUIREMENTS)**

### 5<sup>TH</sup> SEMESTER

OPTI 341 Semiconductor Physics & Lasers (Fall Only)	3	
OPTI 380A Intermediate Optics Laboratory I (Fall Only)	1	
MATH 322 Mathematical Analysis for Engineers	3	
ECE 207 Elements of Electrical Engineering or ECE 220 Basic Circuits	3/5	
MSE 365 Physical Properties of Materials (Fall Only)	3	
OPTI 306 Radiometry, Sources and Detectors (Fall Only)	3	

### 6<sup>TH</sup> SEMESTER

OPTI 330 Physical Optics II (Spring Only)	3	
OPTI 340 Optical Design (Spring Only)	3	
OPTI 370 Laser and Photonics (Spring Only)	3	
OPTI 380B Intermediate Optics Laboratory II (Spring Only)	1	
MSE Elective– See major advisor for course approval	3	
Tier II General Education	3	

### 7<sup>TH</sup> SEMESTER

ENGR 498A Cross-disciplinary Design (Fall Only) – Senior Status	3	
MSE 434 Electrical and Optical Properties of Materials (Fall only)	3	
OPTI 430 Optical Communication Systems (Fall Only)	3	
OPTI 421 Introductory Optomechanical Engineering (Fall Only)	3	
OPTI 471A Advanced Optics Laboratory (Fall Only)	2	
MSE Technical Elective – See major advisor for course approval	2	

### 8<sup>TH</sup> SEMESTER

ENGR 498B Cross-disciplinary Design (Spring Only) – Senior Status	3	
OPTI 415 Optical Specifications, Fabrication, and Testing (Spring Only)	3	
OPTI 471B Advanced Optics Laboratory (Spring Only)	2	
MSE 480 Advanced Characterization Methods in Material Science & Engineering	3	
Tier II General Education	3	

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\*\*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
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### 1<sup>ST</sup> SEMESTER

## OPTO-ELECTRONICS TRACK

COURSE NUMBER AND TITLE	UNITS	PREREQUISITES
MATH 122A/B or MATH 125 Calculus I with Applications	5/3	Appropriate Math Placement
CHEM 151 General Chemistry I or CHEM 105A/106A	4	Appropriate Math Placement
ENGL 101 or 107 or 109H First-Year Composition	3	
ENGR 102A/B Introduction to Engineering or ENGR 102	3	Concurrent enrollment or completion of MATH 122B or 125
Tier I General Education	3	

### 2<sup>ND</sup> SEMESTER

MATH 129 Calculus II	3	MATH 122B or 125 with C or better
MSE 110 Solid State Chemistry	4	CHEM 151 or 105A/106A
PHYS 141 Introductory Mechanics or PHYS 161H	4	MATH 122B or 125
ENGL 102 or 108 First-Year Composition	3	ENGL 101 or ENGL 107
Tier I General Education	3	

### 3<sup>RD</sup> SEMESTER

OPTI 201R Geometrical & Instrumental Optics I (Fall Only)	3	MATH 122B or 125, 129, PHYS 141 or 161H, MSE 110
OPTI 201L Geometrical & Instrumental Optics Lab I (Fall Only)	1	Concurrent enrollment or completion of OPTI 201R
MATH 223 Vector Calculus	4	MATH 129 with a C or better
PHYS 241 Introductory Electricity and Magnetism or PHYS 261H	4	For PHYS 241 or 261H: PHYS 141 or 161H; MATH 129
ECE 274A Digital Logic	4	Concurrent enrollment or completion of MATH 129; programming knowledge

### 4<sup>TH</sup> SEMESTER

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 or completion of in OPTI 202R
OPTI 280 Computer Programming (Spring Only)	1	Major: OSE
OPTI 310 Physics Optics I (Spring Only) – See advisor for registration	3	Adv Stdg: Engineering; MATH 223, 254, PHYS241, OPTI 280
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 or 223 with C or better
ECE 220 Basic Circuits	5	MATH 129 and PHYS 241 or 261H

\*Grade of 'C' or better is required for all OSE curriculum except General Education classes.

## OPTO-ELECTRONICS TRACK

**COURSE NUMBER AND TITLE**

**UNITS**

**CURRENT PREREQUISITES FOR UPPER DIVISION COURSES CAN BE FOUND IN THE UA GENERAL CATALOG**

# OPTO-ELECTRONICS TRACK

## COURSE NUMBER AND TITLE

## UNITS

**ADVANCED STANDING IS REQUIRED FOR 3XX AND 4XX COURSES (SEE ADVISOR FOR REQUIREMENTS)**

### 5<sup>TH</sup> SEMESTER

OPTI 341 Semiconductor Physics & Lasers (Fall Only) 3

OPTI 380A Intermediate Optics Laboratory I (Fall Only) 1

MATH 322 Mathematical Analysis for Engineers 3

ECE Technical Elective- See major advisor for course approval 3

OPTI 306 Radiometry, Sources and Detectors (Fall Only) 3

Tier I General Education 3

### 6<sup>TH</sup> SEMESTER

OPTI 330 Physical Optics II (Spring Only) 3

OPTI 340 Optical Design (Spring Only) 3

OPTI 370 Laser and Photonics (Spring Only) 3

OPTI 380B Intermediate Optics Laboratory II (Spring Only) 1

ECE 381A Introductory Electromagnetics 4

Tier II General Education 3

### 7<sup>TH</sup> SEMESTER

ENGR 498A Cross-disciplinary Design (Fall Only) – Senior Status 3

Tier I General Education 3

OPTI 430 Optical Communication Systems (Fall Only) 3

OPTI 421 Introductory Optomechanical Engineering (Fall Only) 3

OPTI 471A Advanced Optics Laboratory (Fall Only) 2

ECE Technical Elective – See major advisor for course approval 2

### 8<sup>TH</sup> SEMESTER

ENGR 498B Cross-disciplinary Design (Spring Only) – Senior Status 3

OPTI 415 Optical Specifications, Fabrication, and Testing (Spring Only) 3

OPTI 471B Advanced Optics Laboratory (Spring Only) 2

Technical Elective - See major advisor for course approval 3

Tier II General Education 3

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# 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 or CHEM 105A/106A	4	Appropriate Math Placement
ENGL 101 or 107 or 109H First-Year Composition	3	
ENGR 102A/B Introduction to Engineering or ENGR 102	3	Concurrent enrollment or completion of MATH 122B or 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 or 105A/106A
PHYS 141 Introductory Mechanics or PHYS 161H	4	MATH 122B or 125
ENGL 102 or 108 First-Year Composition	3	ENGL 101 or ENGL 107
Tier I General Education	3	
<b>3<sup>RD</sup> SEMESTER</b>		
OPTI 201R Geometrical & Instrumental Optics I (Fall Only)	3	MATH 122B or 125, 129, PHYS 141 or 161H, MSE 110
OPTI 201L Geometrical & Instrumental Optics Lab I (Fall Only)	1	Concurrent enrollment or completion of OPTI 201R
MATH 223 Vector Calculus	4	MATH 129 with a C or better
PHYS 241 Introductory Electricity and Magnetism or PHYS 261H	4	For PHYS 241 or 261H: PHYS 141 or 161H; MATH 129
CE 214 Statics	3	PHYS 141 or 161H; MATH 129
Tier I General Education	3	
<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 or completion of in OPTI 202R
OPTI 280 Computer Programming (Spring Only)	1	Major: OSE
OPTI 310 Physics Optics I (Spring Only) – See advisor for registration	3	Adv Stdg: Engineering; MATH 223, 254, PHYS241, OPTI 280
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 or 223 with C or better
AME 250 Dynamics	3	CE 214; Concurrent enrollment or completion of MATH 254
Tier I General Education	3	

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## OPTO-MECHANICS TRACK

COURSE NUMBER AND TITLE	UNITS
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**CURRENT PREREQUISITES FOR UPPER DIVISION COURSES CAN BE FOUND IN THE UA GENERAL CATALOG**

**ADVANCED STANDING IS REQUIRED FOR 3XX AND 4XX COURSES (SEE ADVISOR FOR REQUIREMENTS)**

### 5<sup>TH</sup> SEMESTER

OPTI 341 Semiconductor Physics & Lasers (Fall Only)	3
OPTI 380A Intermediate Optics Laboratory I (Fall Only)	1
MATH 322 Mathematical Analysis for Engineers	3
ECE 207 Elements of Electrical Engineering or ECE 220 Basic Circuits	3/5
AME 324A Mechanical Behavior of Engineering Materials	3
OPTI 306 Radiometry, Sources and Detectors (Fall Only)	3

### 6<sup>TH</sup> SEMESTER

OPTI 330 Physical Optics II (Spring Only)	3
OPTI 340 Optical Design (Spring Only)	3
OPTI 370 Laser and Photonics (Spring Only)	3
OPTI 380B Intermediate Optics Laboratory II (Spring Only)	1
AME 324B Engineering Component Design	3
Tier II General Education	3

### 7<sup>TH</sup> SEMESTER

ENGR 498A Cross-disciplinary Design (Fall Only) – Senior Status	3
OPTI 430 Optical Communication Systems (Fall Only)	3
OPTI 421 Introductory Optomechanical Engineering (Fall Only)	3
OPTI 471A Advanced Optics Laboratory (Fall Only)	2
AME Technical Elective- See major advisor for course approval	3

### 8<sup>TH</sup> SEMESTER

ENGR 498B Cross-disciplinary Design (Spring Only) – Senior Status	3
OPTI 415 Optical Specifications, Fabrication, and Testing (Spring Only)	3
OPTI 471B Advanced Optics Laboratory (Spring Only)	2
AME Technical Elective – See major advisor for course approval	3
Tier II General Education	3

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\*\*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.