B.S. IN OPTICAL SCIENCES & ENGINEERING

CATALOG YEAR 2019-2020

Below is the *advised sequence* of courses for this degree program and prerequisites as of 12/18/18.
The official degree requirements and prerequisites found in the University General Catalog and the prerequisites are subject to change.

OPTICS TRACK		
COURSE NUMBER AND TITLE	**UNITS**	**PREREQUISITES**
1ST SEMESTER		
MATH 122A/B or MATH 125 Calculus I with Applications	5/3	Appropriate Math Placement
CHEM 151 General Chemistry I or CHEM 161/163	4	Appropriate Math Placement
ENGL 101 or 107 or 109H First-Year Composition	3	
ENGR 102A/B Introduction to Engineering or ENGR 102	3	ENGR102A: MATH 113 or 120R & CHEM 151; Concurrent enrollment or completion of MATH 122B or 125
Tier I General Education	3	
2ND SEMESTER		
MATH 129 Calculus II	3	MATH 122B or 125 with C or better
MSE 110 Solid State Chemistry	4	CHEM 151 or 161/163
PHYS 141 Introductory Mechanics or PHYS 161H	4	MATH 122B or 125 or appropriate Math Placement Level
ENGL 102 or 108 First-Year Composition	3	ENGL 101 or ENGL 107
Tier I General Education	3	
3RD 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 or appropriate Math Placement Level
Technical Elective - See advisor for course approval	3	
Tier I General Education	3	
4TH SEMESTER		
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)	3	Major: OSE; MATH 223, PHYS 241, Concurrent enrollment or completion of MATH 254,OPTI 280
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 or 223 with C or better
Tier 1 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

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OPTICS TRACK

COURSE NUMBER AND TITLE	UNITS
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)	
5TH 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
6TH 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
7TH 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
8TH 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

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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-MATERIALS TRACK

COURSE NUMBER AND TITLE	UNITS	PREREQUISITES
1ST 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 161/163	4	Appropriate Math Placement
ENGL 101 or 107 or 109H First-Year Composition	3	
ENGR 102A/B Introduction to Engineering or ENGR 102	3	ENGR102A: MATH 113 or 120R & CHEM 151; Concurrent enrollment or completion of MATH 122B or 125
Tier I General Education	3	
2ND SEMESTER		
MATH 129 Calculus II	3	MATH 122B or 125 with C or better
MSE 110 Solid State Chemistry	4	CHEM 151 or 161/163
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	
3RD 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 or appropriate Math Placement Level
Tier I General Education	3	
4TH SEMESTER		
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)	3	Major: OSE; MATH 223, PHYS 241, Concurrent enrollment or completion of MATH 254, OPTI 280
MATH 254 Intro to Ordinary Differential Equations	3	MATH 129 or 223 with C or better
MSE 345 Thermodynamics (Spring Only)	4	MATH 129, CHEM 151, MSE 110 or CHEM 152 or Department consent
Tier 1 General Education	3	

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OPTO-MATERIALS TRACK

COURSE NUMBER AND TITLE	UNITS
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)	
5TH 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
6TH 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
7TH 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
8TH 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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OPTO-ELECTRONICS TRACK

COURSE NUMBER AND TITLE	UNITS	PREREQUISITES
1ST 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 161/163	4	Appropriate Math Placement
ENGL 101 or 107 or 109H First-Year Composition	3	
ENGR 102A/B Introduction to Engineering or ENGR 102	3	ENGR102A: MATH 113 or 120R & CHEM 151; Concurrent enrollment or completion of MATH 122B or 125
Tier I General Education	3	
2ND SEMESTER		
MATH 129 Calculus II	3	MATH 122B or 125 with C or better
MSE 110 Solid State Chemistry	4	CHEM 151 or 161/163
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	
3RD 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 or appropriate Math Placement Level
ECE 175 Computer Programming for Engineering Applications	3	Concurrent enrollment or completion of MATH 122B or 125
4TH 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 210 Physics Optics I (Spring Only)	3	Major: OSE; MATH 223, PHYS 241, Concurrent enrollment or completion of MATH 254, 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

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ADVANCED STANDING IS REQUIRED FOR 3XX AND 4XX COURSES (SEE ADVISOR FOR REQUIREMENTS)	
5TH 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 274A Digital Logic	4
OPTI 306 Radiometry, Sources and Detectors (Fall Only)	3
Tier I General Education	3
6TH 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
7TH 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
8TH 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
ECE 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
1ST SEMESTER		
MATH 122A/B or MATH 125 Calculus I with Applications	5/3	Appropriate Math Placement
CHEM 151 General Chemistry I or CHEM 161/163	4	Appropriate Math Placement
ENGL 101 or 107 or 109H First-Year Composition	3	
ENGR 102A/B Introduction to Engineering or ENGR 102	3	ENGR102A: MATH 113 or 120R & CHEM 151; Concurrent enrollment or completion of MATH 122B or 125
Tier I General Education	3	
2ND SEMESTER		
MATH 129 Calculus II	3	MATH 122B or 125 with C or better
MSE 110 Solid State Chemistry	4	CHEM 151 or 161/163
PHYS 141 Introductory Mechanics or PHYS 161H	4	MATH 122B or 125 or appropriate Math Placement Level
ENGL 102 or 108 First-Year Composition	3	ENGL 101 or ENGL 107
Tier I General Education	3	
3RD 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 or appropriate Math Placement Level
CE 214 Statics	3	PHYS 141 or 161H; MATH 129
Tier I General Education	3	
4TH 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 210 Physics Optics I (Spring Only)	3	Major: OSE; MATH 223, PHYS 241, Concurrent enrollment or completion of MATH 254, 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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5TH 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
6TH 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
7TH 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
8TH 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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