

PHYSICS, B. S.

OPTOELECTRONICS CONCENTRATION (OPEL)

(Fall 2017-Summer 2018)

Physics BS Courses (84 credits)

*Note: 2.0 GPA required in Physics courses/B.S. degree

- _____ 5 PHYS 15200 Mechanics (C- or above)
- _____ 5 PHYS 25100 Heat, Electricity and Optics
- _____ 3 PHYS 30500 Intermediate Math Physics
- _____ 4 PHYS 31000 Intermediate Mechanics
- _____ 3 PHYS 31200 Intermediate Electricity & Magnetism
- _____ 3 PHYS 32200 Intermediate Optics
- _____ 3 PHYS 32500 Scientific Computing
- _____ 3 PHYS 34200 Modern Physics
- _____ 1 PHYS 34300 Modern Physics Laboratory
- _____ 1 PHYS 34500 Optics Laboratory I
- _____ 1 PHYS 34600 Advanced Laboratory I
- _____ 4 PHYS 36100 Electronics for Scientists
- _____ 3 PHYS 41310 Electricity & Magnetism II
- _____ 3 PHYS 41800 Thermal Physics
- _____ 3 PHYS 44200 Quantum Mechanics
- _____ 3 PHYS 48001 Senior Thesis I
- _____ 0 1 Class in PHYS 48002 Senior Thesis II

Optoelectronics Concentration

- _____ 3 PHYS 51100 Laser Physics
- _____ 3 PHYS 52200 Cochrer Optics Quant Elect
- _____ 4 PHYS 52400 Optics Spectroscopy
- _____ 4 PHYS 53600 Electronic Technol Rsrch

Supporting Courses

- _____ 4 MA 16500 Analytic Geometry & Calculus I (C- or above)
- _____ 4 MA 16600 Analytic Geometry & Calculus II (C- or above)
- _____ 4 MA 26100 Multivariate Calculus (C- or above)
- _____ 3 MA 35100 Elementary Linear Algebra (C- or above)
- _____ 3 MA 36300 Differential Equations
- _____ 4 CHM 11500 General Chemistry

A&S BS Liberal Arts Requirements (14 credits — credits may vary with double counting/language placement — see advisor)

- _____ 3 Second Semester Writing (C- or higher) (ENG W140 or ENG W233)
 - _____ 3 Speaking Requirement (C- or higher) (COM 11400 or HIST H125)
 - _____ 8 Credits Language Sequence (credit/placement required for 2 semesters of foreign language)
 - _____ FL (1st semester) _____ FL (2nd semester—one course at second semester level required)
- Options: (Arabic, French, German, Japanese, Latin, Spanish)

General Education Requirements (33 Credits)

*Note: grades of C- or higher required in Gen Ed/2.0 GPA

****Up to 6 credits in Gen Ed GA1 to GB7 and 3 credits GCAP (C8) may originate in major discipline—see advisor for more information.**

- _____ 3 GA1 Category A1 -- Written Communication (See Bulletin or myBLUEprint for **General Education** courses)
- _____ 3 GA2 Category A2 -- Speaking and Listening
- _____ 3 GA3 Category A3 -- Quantitative Reasoning
- _____ 3 GB4 Category B4 -- Scientific Ways of Knowing
- _____ 3 GB5 Category B5 -- Social & Behavioral Ways of Knowing
- _____ 3 GB6 Category B6 -- Humanistic and Artistic Ways of Knowing
- _____ 3 GB7/71 Category B7 or B71 -- Interdisciplinary or Creative Ways of Knowing
- _____ 9 Additional Credits -- Category A or B General Education courses _____
- _____ 3 **GCAP Category C8--Capstone Experience** (IPFW course only)

Minor/Elective Courses to reach 120 credits: _____

IPFW Residency Requirements: _____ 32 credits at 200 level or above at IPFW _____ with 15 of 32 credits at 300-400 in major
 B.S. Requirements: _____ 120 credits _____ 30 credits 300-400 level _____ 2.0 GPA Degree/Gen Ed _____ C- or above in Gen Ed Courses

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Term: Year: 20				Term: Year: 20			
Course No.	Course Title	Pre-Reqs	Crs.	Course No.	Course Title	Pre-Reqs	Crs.
MA 165000 (GA3)	Analytic Geometry & Calculus 1	MA 159 or 154 (C- or above); placement	4	MA 16600	Analytic Geometry & Calculus II	MA 165 (C- or above)	4
PHYS 17000	Physics Seminar		1	PHYS 15200 (A/B)	Mechanics	C: MA 166	5
COM 11400 or HIST H125 (GA2/A&S)	Fundament of Speech or Great Debates		3	CHM 11600	General Chemistry	CHM 115 (C- or above); MA 163, 165, 227, or 229	4
CHM 11500 (GB4)	General Chemistry	H.S. CHM or CHM 111 (C- or above); MA 154, 227, 229	4	ENG W131 (GA1)	Read, Writ, & Inquiry I	Self-Place or ENG W129 (C- or above)	3
GB5	Gen Ed Social/Behavior		3				
Total Semester Credit Hours			15	Total Semester Credit Hours			16

Term: Year: 20				Term: Year: 20			
Course No.	Course Title	Pre-Reqs	Crs.	Course No.	Course Title	Pre-Reqs	Crs.
MA 26100	Multivariate Calculus	MA 166 (C- or above)	4	MA 35100	Elem Linear Algebra	2 sem calc (C- or above grades)	3
PHYS 25100	Heat, Electricity, and Optics	PHYS 152 (C- or above); P or C: MA 261	5	PHYS 34200	Modern Physics	PHYS 241 or 251 or 261	3
ENG W233 (A/B)	Intermed Expos Writing	ENG W131 (C- or above)	3	PHYS 34300	Modern Physics Lab	C: PHYS 342	1
GB6	Gen Ed Hum/Artistic		3	PHYS 31200	Interm Electricity & Magnetism	PHYS 251 and MA 363	3
				GCAP (C8)	Gen Ed Capstone		3
					Gen Ed A/B course		3
Total Semester Credit Hours			15	Total Semester Credit Hours			16

Term: Year: 20				Term: Year: 20			
Course No.	Course Title	Pre-Reqs	Crs.	Course No.	Course Title	Pre-Reqs	Crs.
MA 36300	Differential Equations	MA 261 or 263; P or C: MA 351 (C- or above grades required)	3	PHYS 41800	Thermal Physics	PHYS 342	3
PHYS 41310	Electricity & Magnetism II	PHYS 31200	3	PHYS 30500	Intermed Math Physics	PHYS 251	3
PHYS 32500	Scientific Counting	√	3	PHYS 32200	Intermediate Optics	PHYS 251/equiv	3
PHYS 34600	Advanced Lab I	PHYS 343	1	PHYS 34500	Optics Lab I	C: PHYS 322	1
Elective	Free elective		2	PHYS 53600	Electronic Technq Rsrch	PHYS 251/equiv	4
Total Semester Credit Hours			12	Total Semester Credit Hours			14

Term: Year: 20				Term: Year: 20			
Course No.	Course Title	Pre-Reqs	Crs.	Course No.	Course Title	Pre-Reqs	Crs.
PHYS 44200	Quantum Mechanics	PHYS 342 and MA 363 (C- or above grades)	3	PHYS 31000	Intermed Mechanics	PHYS 152 and 251; MA 261 or 263	4
PHYS 48001	Senior Thesis I	√	3	PHYS 36100	Electronics for Scientists	PHYS 251	4
PHYS 51100	Laser Physics	PHYS 322 and 342	3	PHYS 52200	Cohr Optcs Quant Elect	PHYS 322, 330, 550	3
PHYS 52400	Optics Spectroscopy	PHYS 322/equiv	4	PHYS 48002	Senior Thesis II	√	0
FL11	Foreign Language 1		4	FL 12 (GB7/71)	Foreign Language 2 (language may fulfill GB7)	FL 1/ placement	4
Total Semester Credit Hours			17	Total Semester Credit Hours			15

√ = See IPFW Bulletin or myBLUEprint for additional course prerequisites

Summer Courses:

120 credits required for Bachelor of Science degree
2.0 GPA required for Bachelor of Science degree/major