

# IUPUI School of Science – B.S. in Physics / M.S. in Mechanical Engineering

## FIRST-YEAR EXPERIENCE

Windows on Science SCI I120 1 cr. \_\_\_\_\_  
(With permission another Learning Community may be substituted. Waived only for students who transfer in more than 18 credit hours.)

## AREA I - COMMUNICATION

A. English Composition - 6 credits total  
(grade of C or better in each course)

English Composition ENG W131 3 cr. \_\_\_\_\_

Choose from: ENG W132, W150, W231, W250, W290, W331 or W350, TCM 320 3 cr. \_\_\_\_\_

B. Speech Communication - 3 credits total

Speech Communication COMM R110 3 cr. \_\_\_\_\_

## AREA II - FOREIGN LANGUAGE - not required

## AREA III - GENERAL REQUIREMENTS

A. Humanities, Social Sciences, & Comparative World Cultures  
15 credits total

History of Western Civilization II H114 3 cr. \_\_\_\_\_

OR Perspectives on the World H109 3 cr. \_\_\_\_\_

One course each from Lists H, S, and C (9 cr.):

\_\_\_\_\_  
(See School of Science Course List)

B. Junior/Senior Integrator – not required

Replace with general educ. course (3 cr.) \_\_\_\_\_

C. Physical and Biological Sciences – 4 lecture courses  
minimum 16 credits total

Principles of Chemistry I CHEM C105 (3 cr.) \_\_\_\_\_

Experimental Chemistry I CHEM C125 (2 cr.) \_\_\_\_\_

Principles of Chemistry II CHEM C106 (3 cr.) \_\_\_\_\_

Experimental Chemistry II CHEM C126 (2 cr.) \_\_\_\_\_

Two additional physical or biological science or engineering courses approved by the Dept. of Physics:

\_\_\_\_\_

D. Mathematics and Computer Course Requirements  
minimum 24 credits total

Analytic Geom. & Calc. I MATH 165 (4 cr.) \_\_\_\_\_

Analytic Geom. & Calc. II MATH 166 (4 cr.) \_\_\_\_\_

Multidimensional Math. MATH 171 (3 cr.) \_\_\_\_\_

Multivariate Calculus MATH 261 (4 cr.) \_\_\_\_\_

Ordinary Differential Eqs. MATH 266 (3 cr.) \_\_\_\_\_

One 3-credit course beyond MATH 266 \_\_\_\_\_

(as approved by the Dept. of Physics)

One course in Computer Science (3-4 cr.) \_\_\_\_\_  
(CSCI 230, N305, N331, or higher)

**Note: Students must have grades of C– or higher in Area IIID. A grade of D or D+ will be allowed for one course only.**

## AREA IV - MAJOR COURSES

A. Physics – 24 credits total

Mechanics PHYS 152 (4 cr.) \_\_\_\_\_

Heat, Electricity, & Optics PHYS 251 (5 cr.) \_\_\_\_\_

Intermediate Mechanics PHYS 310 (4 cr.) \_\_\_\_\_

Intermediate E & M PHYS 330 (3 cr.) \_\_\_\_\_

Modern Physics PHYS 342 (3 cr.) \_\_\_\_\_

Electronics Laboratory PHYS 353 (2 cr.) \_\_\_\_\_

Thermal Physics PHYS 416 (3 cr.) \_\_\_\_\_

B. Mechanical Engineering – 11 credits total

Mechanics of Materials ME 272 (4 cr.) \_\_\_\_\_

Modeling Dynamic Systems ME 330 (3 cr.) \_\_\_\_\_

Engineering Design ME 462 (4 cr.) \_\_\_\_\_

C. Advanced Courses – 36 credits total

**Note: Students must apply for admission into the Master's program in Mechanical Engineering during their Junior year in order to be able to enroll in 500-level or higher courses.**

Applied Mathematics I MATH 537 (3 cr.) \_\_\_\_\_

Advanced Mathematics II MATH 528 (3 cr.) \_\_\_\_\_

Intro to Quantum Mech. PHYS 550 (3 cr.) \_\_\_\_\_

Four 500-level ME primary area courses:  
(Consult the *ME Master's Program Handbook*.)

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Two 400 or 500 level PHYS or ME electives:

\_\_\_\_\_

One 500-level or higher PHYS or MATH: \_\_\_\_\_

Minimum of 6 credits from the two following courses:

Master's Thesis Option ME 698 (3 cr.) \_\_\_\_\_

500-level ME primary /related course (3 cr.) \_\_\_\_\_

## AREA V – ELECTIVES

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A minimum of 142 credits must be completed for graduation with both the B.S. in Physics and M.S. in Mech. Engineering.

Revised 6/2010

## B.S. in Physics/M.S. in Mechanical Engineering Sample Program (Minimum 142 cr. required)

### FRESHMAN YEAR

#### First Semester

CHEM C105 Principles of Chemistry I	3
CHEM C125 Experimental Chemistry I	2
MATH 165 Analytic Geometry and Calculus I	4
MATH 171 Multidimensional Mathematics	3
SCI I120 Windows on Science	1
ENG W131 Elementary Composition I	3

**Total** **16**

#### Second Semester

PHYS 152 Mechanics	4
CHEM C106 Principles of Chemistry II	3
CHEM C126 Experimental Chemistry II	2
MATH 166 Analytic Geometry and Calculus II	4
Second composition course	3

**Total** **16**

#### Summer Term

Two courses from Lists H, S, or C	6
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**Total** **6**

### SOPHOMORE YEAR

#### Third Semester

PHYS 251 Heat, Electricity, and Optics	5
MATH 261 Multivariate Calculus	4
CSCI Course	4
HIST H114 History of Western Civilization II	3

**Total** **16**

#### Fourth Semester

PHYS 330 Intermediate Electricity and Magnetism	3
PHYS 342 Modern Physics	3
PHYS 353 Electronics Laboratory	2
MATH 266 Ordinary Differential Equations	3
COMM R110 Fundamentals of Speech Communication	3
Elective	3

**Total** **17**

#### Summer Term

One course from Lists H, S, or C	3
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**Total** **3**

### JUNIOR YEAR

#### Fifth Semester

PHYS 310 Intermediate Mechanics	4
ME 272 Mechanics of Materials	4
ME 330 Modeling and Analysis of Dynamic Systems	3
CAND 991 Candidate for Graduation (with B.S. in Physics)	0
Physical or biological science elective	5

**Total** **16**

#### Sixth Semester

PHYS 416 Thermal Physics	3
ME 462 Engineering Design	4
MATH Course	3
Physical or biological science elective	3
General education elective	3

**Total** **16**

### SENIOR YEAR

#### Seventh Semester

PHYS 550 Introduction to Quantum Mechanics	3
ME 500-level ME primary area course	3
Elective: 400 or 500 level Engineering or Physics	3
MATH 537 Applied Mathematics for Sci. & Eng. I	3

**Total** **12**

#### Eighth Semester

ME 500-level ME primary area course	3
Elective: 400 or 500 level Engineering or Physics	3
MATH 528 Advanced Mathematics for Eng. & Phys. II	3

**Total** **9**

### FIFTH YEAR

#### Ninth Semester

Science Elective: Graduate PHYS or MATH Course	3
ME 500-level ME primary area course	3
ME 500-level ME primary area course	3

**Total** **9**

#### Tenth Semester

ME 698 (thesis option) or ME 500-level ME primary/related area course	3
ME 698 (thesis option) or ME 500-level ME primary/related area course	3
Science elective: Graduate PHYS or MATH course	3
CAND 991 Candidate for Graduation (with M.S. in ME)	0

**Total** **9**

Science electives (5<sup>th</sup> and 6<sup>th</sup> semesters) may be replaced by engineering courses with departmental approval.

Consult the *Department of Mechanical Engineering Master's Program Handbook* for ME primary and related courses.

Revised 4/2009