

DEPARTMENT OF NATURAL, INFORMATION, AND MATHEMATICAL SCIENCES

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Bachelor of Arts in Biological and Physical Sciences

The Bachelor of Arts degree in Biological and Physical Sciences centers on a traditional core of courses in the humanities and social and behavioral sciences, as well as the natural sciences. Through academic counseling and proper course selection, students may choose a curriculum that is uniquely suited to their specific needs in the biological and physical sciences. Students may follow a very specific curriculum or they may elect to pursue a more general science education. Graduates of the program are prepared to continue their education at the graduate level of certain disciplines or to enter a health-related profession such as medicine, dentistry, or optometry.

See the section entitled "The Arts and Sciences Curriculum" in the *Bulletin* for specific degree requirements.

Bachelor of Arts in Biology

The Bachelor of Arts degree in Biology centers on a traditional core that includes cell biology, genetics, morphology, physiology, plant science, and microbiology. Additional courses in general chemistry, organic chemistry, physics, and mathematics round out the basic program. In addition to their scientific training, students in biology are expected to be able to communicate effectively and to possess an understanding of Western culture and society. As students in the Division of Arts and Sciences, biology students are exposed to a core of courses in the humanities and social and behavioral sciences, as well as the natural sciences. Graduates of the program are well suited to continue their education at the graduate level, or to enter a health-related profession such as medicine or dentistry. The degree program is structured along three tracks to enable students to pursue post baccalaureate studies. These tracks are biology, pre-medicine, and pre-dentistry.

Degree Requirements

1. Students must complete a minimum of 120 credit hours with a cumulative grade point average of 2.0 or higher.

2. Communication—Students must be able to communicate effectively both orally and in writing. This requirement will be satisfied by completing ENG-W 131-132 Elementary Composition I-II and SPCH-S 121 Public Speaking with grades of C or higher, and approved intensive writing course with a grade of C- or higher.
3. Western Civilization—HIST-H 113-114 History of Western European Civilization I-II is required.
4. Foreign Language—Six credit hours at the 200 level (or higher) in a foreign language are necessary. The first year (100-level courses) in the language will apply toward the degree at Kokomo. Students who have studied a foreign language prior to entering Indiana University are required to take the CEEB Achievement Test in that language. Students who place into the second year of a language on such a test will be eligible to receive S credit for the first year upon completion of a second-year course in that language with a grade of C or higher. Students who place into the second semester of a language will be eligible to receive S credit for the first semester upon completion of the second-semester course with a grade of C or higher. First- and second-year language courses may not be taken on the Pass/Fail option in a student's first foreign language. Foreign students may not receive credit for their native language.
5. General Education— At least 40 credit hours must be selected from the three departments of humanities, social and behavioral sciences, and natural, information, and mathematical sciences. These 40 credit hours do not include the requirements mentioned in items 2-4 above (communication, Western civilization, and foreign language). Also required are a freshman literature course and one course to be selected from the arts (fine arts, music, and theater) or philosophy. Of the 40 credit hours in general education, a total of 5 - 6 hours must be included from the humanities, 9 hours from the social and behavioral sciences, and 13 hours from the biological and physical sciences, including two courses (one biological and one physical science) involving a laboratory.
6. Arts and Sciences—A student must complete at least 30 credit hours in 300-400-level courses within the arts and sciences, though not necessarily in one department.
7. Specific Biology Degree Requirements—Students must complete BIOL-L 105 Introduction to Biology, CHEM-C 105 Principles of Chemistry I, CHEM-C 106 Principles of Chemistry II, CHEM-C 125 Experimental Chemistry I, CHEM-C 126 Experimental Chemistry II, CHEM-C 341 Organic Chemistry I, CHEM-C 342 Organic Chemistry II, CHEM-C 343 Organic Chemistry I Laboratory, CHEM-C 344 Organic Chemistry II Laboratory, PHYS-P 201 General Physics I, and PHYS-P 202 General Physics II; and either MATH-M 119 Brief Survey of Calculus I or MATH-M 215 Calculus I (mathematics courses require a grade of C- or higher). In addition, students must satisfy the computer literacy requirement.
8. Biology Courses—A minimum of 33 credit hours in biology at or above the 200 level must be taken with a grade of C- or better in each course. The following biology courses are required: PLSC-B 203 Survey of the Plant Kingdom, ZOOL-Z 315 Developmental Anatomy, BIOL-L 364 Principles of Genetics, MICR-M 310 Microbiology, MICR-M 315 Microbiology Laboratory, BIOL-L 473 Ecology, PHSL-P 416 Comparative Animal Physiology, and BIOL-L 403 Biology Seminar. Students must also select a minimum of 6 credits from the following courses: BIOL-L 321 Immunology (3 cr.), BIOL-K 339 Immunology Laboratory (2 cr.); BIOL-L 477

Computers in Biology (3 cr.); BIOL-L 490 Individual Study (1-12 cr.); CHEM-C 483 Biological Chemistry (3 cr.); PLSC-B 364 Summer Flowering Plants (5 cr.); and BIOL-L 367 Cell Physiology (3 cr.).

Biology Honors Degree

A biology honors degree is available to qualified students. See the section entitled “Honors Program” in this bulletin. Students pursuing the biology honors degree must complete two credits of honors colloquia and a minimum of 6 credits from the following: BIOL-H 339 Immunology Laboratory (2 cr.), PHSL-P 418 Comparative Animal Physiology Laboratory (2 cr.), BIOL-H 474 Ecology Laboratory (2 cr.), and BIOL-H 490 Individual Study (1-12 cr.). No more than 15 credit hours in courses outside of the arts and sciences subject areas, e.g., business or education, may be applied toward the degree. Thirty of the last 60 hours must be completed at Indiana University Kokomo.

Biology Minor

To earn a minor in biology students must take the following courses:

Required:

- B203 Survey of the Plant Kingdom (5 cr.)
- L105 Introduction to Biology (5 cr.)

plus 6 to 10 hours from the following:

- L364 Principles of Genetics (3 cr.)
- L321 Immunology (3 cr.)
- L367 Cell Physiology (3 cr.)
- L473 Ecology (3 cr.)
- M310/315 Microbiology/Lab (5 cr.)
- P416 Comparative Animal Physiology (3 cr.)
- Z315 Developmental Anatomy (5 cr.)

Students must take all the necessary prerequisites before enrolling in courses required for the minor.

Bachelor of Arts in Chemistry

The Bachelor of Arts (B.A.) Degree in Chemistry centers on a traditional core that includes organic, analytical, inorganic and physical chemistry; biochemistry, and mathematics. But good scientists also need to be exposed to other fields of knowledge—to the arts, the social sciences, and humanities. As students in the Division of Arts and Sciences, the curriculum also includes course requirements in subject areas such as history, English, sociology, psychology, foreign languages, mathematics, and information sciences. To graduate, a minimum of 120 credit hours are needed, 37 of these are in required chemistry courses and 83 in required general education courses. Students planning to enter graduate or professional school after earning a bachelor's degree should inquire about IU Kokomo's pre-professional tracks in biology, pre-medicine, and pre-dentistry. If you're interested in becoming a science educator, IU Kokomo offers a program that enables students to earn a chemistry degree and become certified to teach chemistry at the secondary school level. The certification program requires an additional 32 credit hours of methods and professional education curriculum, which are taken through the Division of Education.

Degree Requirements

1. Students must complete a minimum of 120 credit hours with a cumulative grade point average of 2.0 or higher.
2. English—Students must be able to communicate effectively. This requirement will be satisfied by completing ENG-W 131 and 132, Elementary Composition I and II, with grades of C or higher and an approved intensive writing course with a grade of C- or higher.
3. Foreign Language—Six hours at the 200 level (or higher) in a foreign language will apply toward the degree at Kokomo. Students who have studied a foreign language prior to entering Indiana University are required to take the CEEB Achievement Test in that language. Students who place into the second semester of a language will be eligible to receive S credit for the first semester upon completion of the second semester course with a grade of C or higher. First- and second-year language courses may not be taken on a pass/fail option in a student's first foreign language. Foreign students may not receive credit for their native language.
4. General Education—At least 37 credit hours must be selected from the three departments of Humanities, Social and Behavioral Sciences, Natural, Information and Mathematical Sciences. These 37 credit hours do not include the requirements mentioned in items 2 and 3 above (English, Foreign Language) or in item 6 (Major). Eleven to twelve credit hours must be selected from the humanities department, including a literature course, Public Speaking, SPCH-S 121 (with a grade of C- or higher), and an additional 5 – 6 credit hours including a performance and an ethics class. Fifteen credit hours must be selected from the social and behavioral sciences, including 6 credit hours of Western European Civilization I and II, HIST-H 113 and 114; and nine credit hours selected from at least two different areas within the department of Social and Behavioral Sciences. Thirteen credit hours must be selected from the biological, physical, mathematical and information sciences, including two courses involving a laboratory – one in the biological and one in the physical sciences; as well as one course without a laboratory.
5. Arts and Sciences—A student must complete at least 30 credit hours in 300/400-level courses within the arts and sciences, though not necessarily in one department.
6. Major—Students must complete CHEM-C 105, Principles of Chemistry I; CHEM-C 106 Principles of Chemistry II; CHEM-C 125, Experimental Chemistry I; CHEM-C 126, Experimental Chemistry II; CHEM-C 210, Introduction to Quantitative Analytical Chemistry, CHEM-C 211, Introduction to Quantitative Analytical Chemistry Laboratory, CHEM-C 310, Analytical Chemistry; CHEM-C 311, Analytical Chemistry Laboratory; CHEM-C 341 and 342, Organic Chemistry Lectures I and II; CHEM-C 343 and 344, Organic Chemistry Laboratory I and II; CHEM-C 361, Physical Chemistry I, 3 additional credit hours of chemistry courses at the 300/400 level, and CHEM-C 495, Capstone in Chemistry with grades of C or higher.
7. The following courses outside of chemistry must also be completed: BIOL-L 105, Introduction to Biology; PHYS-P 201 and 202, General Physics I and II; MATH-M 215 and 216, Calculus I and II (with a grade of C- or higher); CSCI-C 106, Introduction to Computers and Their Use; Statistics PSY-K 300 or STAT 301, and an

upper level science elective. These courses may be used to satisfy the general educational requirements described in item 4.

8. Recommended additional courses—Students wishing to pursue a graduate degree in chemistry should include, in addition to the courses listed previously, CHEM-C 362, Physical Chemistry II; CHEM-C 430, Inorganic Chemistry; CHEM-C 483, Biological Chemistry, CHEM-C 409, Chemical Research, CHEM-C 443, Organic Spectroscopy, CHEM-C 400, Chemical Information Sources and Services and CHEM-C495, Capstone in Chemistry.
9. No more than 15 credit hours in courses outside of the arts and science subject areas, e.g., business or education, may be applied towards the degree. Thirty of the last 60 credit hours must be completed at Indiana University Kokomo.

Bachelor of Science in Computer Information Systems

(This program is being phased out effective with the entering class of Fall 2006)

The Bachelor of Science degree in Computer Information Systems is a four-year degree that involves the study of computers and their applications. The computer core courses ensure that graduates will have a broad understanding of Computer Information Systems. To complement this knowledge of computers, a minor in another area is required. This will enable program graduates to become important contributors within the organizations they serve.

Degree Requirements:

1. 120 credit hours with a cumulative grade point average of at least 2.0.
2. Written Communication—ENG-W 131-132 Elementary Composition I-II and ENG-W 231 Professional Writing Skills, with a minimum grade of C in each.
3. Oral Communication—SPCH-S 121 Public Speaking, with a minimum grade of C.
4. History—HIST-H 113-114 History of Western European Civilization I-II and an additional 3 credits in Social and Behavioral Sciences.
5. Humanities—6 credit hours.
6. Natural Science—One laboratory science course, 4 or 5 credit hours.
7. Mathematics—MATH-M 118 Finite Mathematics and MATH-M 125 Pre-calculus Mathematics, with a minimum grade of C, STAT 301 Elementary Statistical Methods I or ECON-E 270 Statistical Theory in Economics and Business or PSY-K 300 Statistical Techniques.
8. Students must complete 30 of the last 60 credit hours at Indiana University Kokomo. Minor—Each student must also complete the requirements for any approved Indiana University Kokomo minor.

Required Courses:

The following courses must be completed with a grade of at least C-:

- CSCI-C 106 Introduction to Computers and Their Use
- CSCI-C 297 Visual Basic with SQL –or- INFO-I 210 Information Infrastructure I
- DPIS-D 250 Multimedia
- CSCI-C 309 Objected-oriented Programming – or – I211- Information Infrastructure II
- DPIS-D 335 Computer Hardware, System Software, and Architecture
- DPIS-D 345 Database Systems Management and Design
- CSCI-C 445 Information Systems Design

- INFO-I 303 Organizational Informatics
 - DPIS-D 490 Current Directions in Information Systems
- Two additional 200-level or higher approved computer courses

Post baccalaureate Certificate in Computer Information Systems

Requirements:

This program is being phased out. No new students are being accepted into the program

1. Students must possess an earned baccalaureate degree.
2. Students must complete a minimum of 30 credit hours with a GPA of at least 2.0 and a minimum grade of C- in each course.
3. Students must take the following: CSCI-C 106 Introduction to Computers and Their Use; DPIS-D 250 Multimedia; CSCI-C 297 Visual Basic and SQL; CSCI-C 309 Objected-oriented Programming; DPIS-D 335 Computer Hardware, System Software, and Architecture; DPIS-D 345 Database Systems Management and Design; CSCI-C 445 Information Systems Design; BUS-S 302 Management Information Systems; DPIS-D 490 Current Directions in Information Systems and one additional 200-level or higher approved Computer Information Systems courses.

Minor in Computer Information Systems

This program is being phased out effective Fall 2009

The minor in Computer Information Systems involves the study of computer systems, including computer-specific terminology, and a fundamental ability to use and develop computer programs.

Required Courses (15 cr.) Minimum grade in all courses is a C-:

- CSCI-C 106 Introduction to Computers and Their Use
- DPIS-D 250 Multimedia

A programming course: CSCI-C 297 (or INFO-I 210) or 309 (or INFO-I 211) (Check bulletin for proper prerequisites)

Two additional 300 – 400 level computer courses (Check bulletin for proper prerequisites)

Bachelor of Science in Informatics

Informatics is the application of Information Technology to a particular area or discipline of study. It is concerned with converting data into information.

Degree Requirements:

Students must successfully complete a minimum of 122 credit hours for the Bachelor of Science degree. Ordinarily, the maximum number of transfer credit hours that may be counted toward graduation is 96, including credits earned at other campuses of Indiana University. Not more than 60 credit hours earned in accredited junior colleges may be credited toward a degree. Students must complete the specific degree requirements of the Bachelor of Science in Informatics as detailed below:

- A minimum of 30 credit hours must be taken at the 300-level or above.
- No course may be used both in the major and in a minor. Cognate courses used as part of an Informatics major can be counted toward a minor.
- Any course used to meet major requirements may also be used to meet one but not more than one of the general education distribution requirements. Other courses,

including those in the minor, may be used in two, but no more than two, of the general distribution requirements. No course may be used to meet more than one requirement in a single distribution requirement.

- Courses that fulfill the requirements for a cognate area may also meet the general education distribution requirements.
- Cognate area courses cannot count as Informatics core courses
- If cognate area courses are equivalent to Informatics core courses, students should substitute additional Informatics elective courses in place of Informatics core courses to meet the 34 credit hour requirement. (See Informatics core courses)
- Any course in the Informatics Core, and the cognate area must be completed with a grade of C- or better. A minimum overall GPA of 2.0 in Informatics Core and the cognate area is required. Courses in other departments that are used to fulfill general education requirements or general electives may be completed with any passing grade except ENG-W 131 which requires a grade of C. A minimum overall GPA of 2.0 is required for graduation.

Zero level mathematics and English courses do not count in the 122 credit hours required for graduation and cannot be used to fulfill distribution requirements.

CURRICULUM

The course work required for the BS degree in Informatics consists of:

1. Informatics Core Courses (34 cr.)

INFO-I 101 Introduction to Informatics (4 cr.)

INFO-I 201 Mathematical Foundations of Informatics (4 cr.)

INFO-I 202 Social Informatics (3 cr.)

INFO-I 210 Information Infrastructure 1 (4 cr.)

INFO-I 211 Information Infrastructure 11 (4 cr.)

INFO-I 308 Information Representation (3 cr.)

INFO-I 300 Human-Computer Interaction (3 cr.)

INFO-I 303 Organizational Informatics (3 cr.)

One of the following capstone options:

INFO-I 450/451 Design & Development of an Information System (3 - 3 cr.) (senior standing; capstone course), 2 semesters — OR —

INFO-I 460/461 Thesis / Senior Project (3 - 3 cr.) (senior standing; capstone experience) 2 semesters.

With prior approval from the program, a student may substitute for I450/451 and I460/461 an equivalent capstone experience in another department, or complete 6 credit hours of INFO-I 420, Internship in Informatics Professional Practice, to fulfill the capstone experience. Internships require students to have a junior or senior standing. A project or report must be submitted after the internship is completed.

2. Global Studies

Choose ONE of the following options:

Course	Course Number	Credits
Option I: Two courses of a foreign language (at the 2 nd year level)	Various	6 cr.
Option II: Two courses from among the following: BUS-D 300, International Business Administration; BUS-D 301, The International Business Environment; BUS-D 302, International Business: Operations of International Enterprises; HIST-C 392, History of the Modern Near East; HIST-D 410, Russian Revolutions and Soviet Regime; HIST-F 447, United States-Latin American Relations; POLS-Y 217, Introduction to Comparative Politics; POLS-Y 219, Introduction to International Relations; POLS-Y 338, African Politics; SPEA-J 355, International Criminal Justice Perspectives	Various	6 cr.
Option III: An overseas study program approved by your advisor	Various	6 cr.

3. Cognate Area - Select One - (15 - 18 cr hours)

Many of the courses in the following tables have prerequisites that must be completed prior to enrollment in the course. Please consult the *Bulletin* for the proper prerequisites.

BIOLOGY

Course	Course Number	Credits
Required Courses:		
Introduction to Biology	BIOL-L 105	5
Principles of Genetics	BIOL-L 364	3
Computers in Biology	BIOL-L 477	3
Select a total 5 - 6 Credits From the Following:		
Survey of the Plant Kingdom	PLSC-B 203	5
Principles of Immunology	BIOL-L 321	3
Microbiology	MICR-M 310	3
Microbiology Laboratory	MICR-M 315	2
Course	Course Number	Credits
Cell Physiology	BIOL-L 367	3
Comparative Animal Physiology	PHSL-P 416	3

Ecology	BIOL-L 473	3
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BUSINESS

Course	Course Number	Credits
Required Courses:		
Economics	ECON-E 200 or ECON-E 300 OR BOTH ECON-E 201 & 202	3 or 6
Choose TWO courses	BUS-A 201, L201 or K201	6
Choose TWO courses	BUS-D 301, Z 302 or S 302	6
Intro to Business	BUS-W 100	3

CHEMISTRY

Courses	Course Number	Credits
Required Courses:		
Principles of Chemistry I	CHEM-C 105	3
Principles of Chemistry II	CHEM-C 106	3
	CHEM-C 341	3
Chemical Information Sources & Services	CHEM-C 400	1
Select Two From the Following:		
Organic Chemistry I: Lecture	CHEM-C 342	3
Analytical Chemistry	CHEM-C 310	3
Physical Chemistry I	CHEM-C 361	3
Inorganic Chemistry	CHEM-C 430	3
Biological Chemistry	CHEM-C 483	3

COGNITIVE SCIENCE

Course	Course Number	Credits
A- Required Courses:		
General Psychology	PSY-P 103	3
Cognitive Psychology	PSY-P 335	3
Introduction to Philosophy	PHIL-P 100	3
B- Select ONE from the following		
Introduction to the Philosophy of the Mind	PHIL-P 360	3
Nineteenth Century Philosophy	PHIL-P 304	3
Phenomenology and Existentialism	PHIL-P 335	3
Logic and Philosophy	PHIL-P 352	3
C - Select ONE From the Following		
Methods of Experimental Psychology	PSY-P 211	3
Neuroscience	PSY-P 326	3
Elementary Logic	PHIL-P 150	3
Any Philosophy course not selected from B above	Various	3

MATHEMATICS

Course	Course Number	Credits
Required Courses:		
Calculus I	MATH-M 215	5
Calculus II	MATH-M 216	5
Calculus III	MATH-M 311	4
Select ONE from the following:		
Linear Algebra for Undergraduates	MATH-M 303	3
Elementary Differential Equations with Applications	MATH-M 313	3
Discrete Mathematics	MATH-M 347	3
Elements of Probability	MATH-M 360	3

NEW MEDIA

Course	Course Number	Credits
Required Courses:		
Visual Communication	NMCM-N 120	3
Web Writing and Usability	NMCM-N 315	3
Select THREE From the Following:		
Digital Art	NMCM-N 200	3
Communication Theory	SPCH-S 336	3
New Media Communication Theory	NMCM-N 411	3
Advanced Technical Writing	ENG-W 321	3
Theories and Practices of Editing	ENG-W 365	3
Evolution of New Media Communication	NMCM-N 311	3
Organizational Communication	COM-C 380	3

PUBLIC AND ENVIRONMENTAL AFFAIRS

Course	Course Number	Credits
Required Courses:		
The American Criminal Justice System	SPEA-J 101	3
Introduction to Public Affairs	SPEA-V 170	3
Select THREE From the Following:		
Public Management	SPEA-V 263	3
Managing Behavior in Public Organizations	SPEA-V 366	3
Law and Public Policy	SPEA-V 376	3
Introduction to Environmental Sciences	SPEA-E 272	3

SOCIOLOGY

Course	Course Number	Credits
Required Courses:		
Introduction to Sociology - OR- Social Problems & Policies	SOC-S 100 or 101	3
Methods of Sociological Research	SOC-S 252	3
Statistics	Students electing Sociology as their cognate area should select PSY-K 300 as their statistics course (see Curriculum - 4. General Education - elsewhere in this section)	
THREE additional Sociology Electives at 300 - 400 level	Various	9

4. General Education

1. English: Students must complete ENG-W 131 & 132, Elementary Composition I-II, with a grade of C or higher and an approved intensive writing course with a grade of C- or higher.
2. Speech: Students must complete SPCH-S 121, Public Speaking, with a grade of C or above. SPCH-S 121 Public Speaking may be counted toward distribution requirements.
3. Computer Literacy: Students will meet this requirement through their Informatics course work.
4. Foreign Language: Students must complete 6 credit hours at the 200 level (or higher) in a foreign language. The first year (100 level) will apply as credit toward the degree completed at Kokomo.
5. Mathematics: Students must complete MATH-M 125, Precalculus Mathematics, or MATH-M 118, Finite Mathematics, with a grade of C or better, or MATH-M 119, Brief Survey of Calculus I, or MATH-M215 Calculus I, with a grade of C- or better, or score 565 or higher on the Mathematics SAT or 27 or higher on the Mathematics ACT.
6. General Education Distribution Requirements: A minimum of twenty-eight credit hours selected from the three subject area divisions: humanities, social and behavioral sciences, and natural sciences. These are in addition to the credit hours required in fundamental skills in English, foreign language, speech, mathematics, computer science, and core courses in informatics and cognate areas. At least 3 - 5 credit hours must be selected from the humanities, and must include a performance class and ethics; at least nine credit hours must be selected from the social and behavioral

sciences from three different disciplines; at least 5 credit hours must be selected from the biological sciences, including one course involving a laboratory; at least 5 credit hours must be selected from the physical sciences, including one course involving a laboratory, and an additional 3 credit hours in a non-laboratory science. Course work in mathematics and computer science may be used to satisfy a portion of the physical science requirements. *Students are urged to consult with an advisor to determine the correct classes and their sequencing as not all classes will satisfy the above requirements.*

5. General Electives to total 122 cr hrs

Minor in Informatics

The undergraduate minor in Informatics requires three lower division courses and two upper division courses.

Students are required to take:

- INFO-I 101 Introduction to Informatics (4 cr.)
- INFO-I 202 Social Informatics (3 cr.) – or – INFO-I 213 Web Design and Development (3 cr.)
- INFO-I 210 Information Infrastructure I (4 cr.)
- INFO-I 300 Human Computer Interaction (3 cr.)
- INFO-I 303 Organizational Informatics (3 cr.)

A minimum grade of C- is required in all courses taken for the minor.

Bachelor of Arts in Mathematics

The Bachelor of Arts degree in mathematics is designed to prepare individuals to understand the nature of truth and the concept of proof in the discipline of mathematics, to understand the application of mathematical techniques to other fields, and to formulate and solve problems mathematically. Students may select courses to enter graduate school in mathematics or enter business or industry.

Requirements:

1. Students must satisfy the arts and sciences degree requirements outlined in the *Bulletin* entitled “Degree Requirements” under “Division of Arts and Sciences.”
2. Major Concentration—Students must complete a minimum of 31 credit hours in mathematics with a grade point average of at least 2.0. The following courses are required:
 - MATH-M-215-216 Calculus I-II (10 cr.)
 - MATH-M 311 Calculus III (3 cr.)
 - MATH-M 303 Linear Algebra for Undergraduates (3 cr.)In addition, students must complete one course from Group A and two sequences from Group B, or three courses from Group A and one sequence from Group B.

Group A:

- MATH-M 313 Elementary Differential Equations with Applications (3 cr.)
- MATH-T 336 Topics in Euclidean Geometry (3 cr.)

- MATH-M 360 Elements of Probability (3 cr.)
- MATH-M 366 Elements of Statistical Inference (3 cr.)
- MATH-M 415 Elementary Complex Variables with Applications (3 cr.)

Group B:

- MATH-M 403-404 Introduction to Modern Algebra I-II (6 cr.)
 - MATH-M 413-414 Introduction to Analysis I-II (6 cr.)
 - MATH-M 447-448 Mathematical Models and Applications I-II (6 cr.)
 - MATH-M 471-472 Numerical Analysis I-II (6 cr.)
3. General Examination—Students must pass a written examination covering the entire undergraduate mathematics program. The examination will be given near the end of the semester in which the student is expected to graduate. The mathematics faculty may permit a student who does not perform satisfactorily on the written examination to take an oral examination that same semester. Students who still do not perform satisfactorily may take the general examination the next time it is offered. Those who do not pass the general examination on the second attempt must petition the mathematics faculty to take the general examination a third time, and are expected to document additional preparation in mathematics.
 4. Students must complete 30 of the last 60 credit hours, at least 9 credit hours of mathematics from Groups A or B, and the general examination at Indiana University Kokomo.

Minor in Mathematics

Students must complete a minimum of 20 cr. hours in mathematics with a grade point average of 2.0 or higher. At least 6 cr. hours of mathematics must be completed at IU Kokomo.

Students must complete the following courses:

- MATH-M 215 Calculus I (5 cr.)
- MATH-M 216 Calculus II (5 cr.)
- MATH-M 311 Calculus III (4 cr.)
- MATH-M 303 Linear Algebra for Undergraduates (3 cr.)

Students must also select one from the following list of courses:

- MATH-M 313 Elementary Differential Equations with Applications (3 cr.)
- MATH-T 336 Topics in Euclidean Geometry (3 cr.)
- MATH-M 360 Elements of Probability (3 cr.)
- MATH-M 403 Introduction to Modern Algebra (3 cr.)
- MATH-M 413 Introduction to Analysis I (3 cr.)
- MATH-M 415 Elementary Complex Variables with Applications (3 cr.)
- MATH-M 447 Mathematical Models and Applications I (3 cr.)
- MATH-M 471 Numerical Analysis I (3 cr.)

Natural, Information, and Mathematical Science Courses

Note: The university reserves the right to cancel courses for insufficient enrollment.

P = prerequisite

R = recommended

C = corequisite

* = lab fee

Biological Sciences

Anatomy

(ANAT-A)

215 Basic Human Anatomy (5 cr.)

Fall, Spring. Structure of cells, tissues, organs, and systems and their relationship to function.*

Biology

(BIOL-K)

339 Immunology Laboratory (2 cr.)

P or C: BIOL-L 321. Demonstration of immunological principles by experimentation. Exercises include cells and factors of the innate and the adaptive immune system. *

(BIOL-L)

100 Humans and the Biological World (5 cr.)

Fall, Spring. Principles of biological organization, from molecules through cells and organisms, with special reference given to humans. Credit given for only one 100-level biology course. For nonmajors.*

105 Introduction to Biology (5 cr.)

Fall, Spring. P: high school or college chemistry. Integrated picture of manner in which organisms at diverse levels of organization meet most problems in maintaining and propagating life. Credit given for only one 100-level biology course.*

270 Humans and Microorganisms (3 cr.)

Fall 2004. Alternate years. Beneficial and harmful activities of bacteria, fungi, protozoa, viruses. Production of fermented foods, food poisoning and food borne infections. Introduction to epidemiology, microbial diseases, antibiotics and immunization. Water and wastewater microbiology and waterborne infections.

321 Principles of Immunology (3 cr.)

Spring 2006. Alternate years. P: BIOL-L 105, CHEM-C 101, or CHEM-C 105. An introduction to the basic principles of immunology and its applications. Topics covered include the inflammatory response, complement, cell-mediated and humoral immunity, cell interactions, genetics of the immune response, immunization and immunological methods.

345 Vertebrate Biology (3cr.)

Spring 2010. Alternate years. P: BIOL-L 105. A general overview of the biology of vertebrate animals including aspects of their evolutionary history, taxonomy, anatomy, physiology, ecology, behavior and natural history.

364 Principles of Genetics (3 cr.)

Spring 2005. Alternate years. P: BIOL-L 367 or MICR-M 310. Analysis of genetic mechanisms and processes, recombination, genetic interaction, gene regulation, biotechnical applications, genomics, cancer genetics and evolution.

367 Cell Physiology (3 cr.)

Fall 2004. Alternate years. P: an introductory biology and general chemistry course. R: organic chemistry. Introduction to biochemical structure and metabolic activities of plant, animal, and microbial cells; physiology of membranes; locomotion and response; growth, division, and differentiation of cells.

370 Plants, Animals, and Civilization (3 cr.)

Fall, Spring. R: junior or senior standing. The principal domesticated plants and animals from prehistoric times to the present, with consideration of their origin, spread, and relationship to development of civilization and to present problems of hunger. Not open to students who have had PLSC-B 368. Note: BIOL-L 370 will not count toward a Bloomington or Kokomo biological science degree.

403 Biology Seminar (3 cr.)

Fall 2002. Alternate years. P: junior or senior standing. A seminar course concerned with current topics and issues in the biological sciences.

473 Ecology (3 cr.)

Fall 2005. Alternate years. P: 8 hours of biology. R: BIOL-L 364. Major concepts of ecology for science majors; relation of individual organisms to their environment, population ecology, and structure and function of ecosystems.

474 Laboratory in Ecology (2 cr.)

Arr. P or C: BIOL-L 473. Introduction to research problems and techniques in the ecology of individuals, populations, and ecosystems.*

477 Computers in Biology (3 cr.)

Spring 2006. Alternate years. Applications of mini, micro, and mainframe computers to biological work. Lectures and computer operation. Not concerned with computer programming.

490 Individual Study (cr. arr., 12 cr. max.)

Arr. P: overall GPA of 2.5 or above; must have written consent of faculty member supervising research. Must complete a written assignment as evidence of each semester's work. Must present oral report to complete more than 6 credit hours.

Botany

(PLSC-B)

203 Survey of the Plant Kingdom (5 cr.)

Spring. Survey of various groups of plants, including their structure, behavior, life histories, classification, and economic importance.*

364 Summer Flowering Plants (5 cr.)

Summer P: one introductory biology course. A course for students desiring a broad, practical knowledge of common wild and cultivated plants.*

Microbiology

(MICR-J)

200 Microbiology and Immunology (3 cr.)

Fall, Spring. P: ANAT-A 215 and PHSL-P 215 or equivalent. For students of the baccalaureate curricula in the School of Nursing and in the Division of Allied Health Sciences; others by consent of instructor. Concurrent or previous registration in J201 Microbiology Laboratory is recommended. Basic principles of microbiology, cell biology and epidemiology. Consideration of pathogenic bacteria, viruses, fungi, and parasites in human disease; immunology and host-defense mechanisms.

201 Microbiology Laboratory (1 cr.)

Fall, Spring. P or C: MICR-J 200. Bacteriological techniques of microscopy, asepsis, pure culture, and identification of unknown bacteria. Biology of microorganisms; action of antimicrobial agents and disinfectants, food microbiology and bacterial agglutination

reactions.*

(MICR-M)

310 Microbiology (3 cr.)

Fall 2005. Alternate years. P: two semesters of college chemistry. C: MICR-M 315.

Application of fundamental biological principles to the study of microorganisms. Significance of microorganisms to humans and their environment. Topics covered include bacterial growth and metabolism, microbial genetics, microbial diversity, mechanisms of pathogenicity, epidemiology and environmental microbiology.

315 Microbiology Laboratory (2 cr.)

Fall 2005. Alternate years. C: MICR-M 310. Laboratory exercises and demonstrations to yield proficiency in principles and techniques of cultivation and utilization of microorganisms under aseptic conditions. These principles will include microscopy, asepsis, pure culture, bacterial metabolism, genetic transformation and identification of unknown bacteria.*

Physiology

(PHSL-P)

215 Basic Human Physiology (5 cr.)

Fall, Spring. Functional aspects of cells, tissues, organs, and systems in mammalian organisms. Designed for pre-professional students in allied health, nursing, speech and hearing, and HPER.*

416 Comparative Animal Physiology (3 cr.)

Fall 2005. Alternate years. P: CHEM-C 106, two college biology courses, and one college mathematics course. Physiological principles of the respiratory, circulatory, excretory, and related systems in a variety of invertebrate and vertebrate animals.

418 Laboratory in Comparative Animal Physiology (2 cr.)

Arr. P or C: PHSL-P 416. Laboratory experiments using a variety of animals to illustrate physiological principles.*

Zoology

(ZOOL-Z)

315 Developmental Anatomy (5 cr.)

Fall 2004. Alternate years. P: BIOL-L 105. Comparative study of the structure and development of vertebrates, including humans.*

Physical Sciences

Astronomy

(AST-A)

100 The Solar System (3 cr.)

Spring. Celestial sphere and constellations, measurement of time, astronomical instruments, earth as a planet, the moon, eclipses, planets and their satellites, comets, meteors, theories of origin of solar system.

Chemistry

(CHEM-C)

100 The World of Chemistry (3 cr.)

Fall, Spring. For students requiring only one semester of chemistry. Descriptive course, including inorganic, organic, and biological chemistry, with illustrations of scientific reasoning. May be taken concurrently with the laboratory, CHEM-C 120. Credit given for only one of the following: CHEM-C 100, 101, or 105.

101 Elementary Chemistry I (3 cr.)

Fall. Introduction to chemistry. Usually taken concurrently with CHEM-C 121. The two sequences, CHEM-C 101-C121 and CHEM-C 102-C122, usually satisfy programs that require only two semesters of chemistry. Admission to advanced courses on basis of CHEM-C 101, 121, 102, 122 granted only in exceptional cases. May be taken without credit in preparation for CHEM-C 105. Credit given for only one of the following: CHEM-C 100, 101, or 105.

102 Elementary Chemistry II (3 cr.)

Spring. P: CHEM-C 101. Continuation of CHEM-C 101. Usually taken concurrently with CHEM-C 122. The chemistry of organic compounds and their reactions, followed by an extensive introduction to biochemistry. Credit not given for both CHEM-C 102 and 106.

105 Principles of Chemistry I (3 cr.)

Fall. P: two years of high school algebra or MATH-M 125, which may be taken concurrently; one year of high school chemistry. C: CHEM-C 125. Basic principles, including stoichiometry, thermochemistry, atomic and molecular structure, gases, solutions, and selected topics in descriptive chemistry. Credit given for only one of the following, CHEM-C 100, 101, or 105-125.

106 Principles of Chemistry II (3 cr.)

Spring. P: CHEM-C 125. C: CHEM-C 126 Chemical equilibrium with emphasis on acids, bases, solubility and electrochemistry, elementary thermodynamics, chemical kinetics, and selected topics in descriptive chemistry. Credit not given for both C102, and C106-C126.

120 Chemistry Laboratory (2 cr.)

Fall, Spring. P or C: CHEM-C 100. For nonmajors. An introduction to techniques and reasoning of experimental chemistry. Experiments and projects illustrate topics studied in CHEM-C 100. Credit given for only one of the following: CHEM-C 120, 121 or 125*

121 Elementary Chemistry Laboratory I (2 cr.)

Fall. P or C: CHEM-C 101. An introduction to the techniques and reasoning of experimental chemistry. Credit not given for both CHEM-C 121 and 125.*

122 Elementary Chemistry Laboratory II (2 cr.)

Spring. P: CHEM-C 101, 121. P or C: CHEM-C 102. Continuation of CHEM-C 121. Emphasis on organic and biochemical experimental techniques. Credit not given for both CHEM-C 122 and 126.*

125 Experimental Chemistry I (2 cr.)

Fall. C: CHEM-C 105. Introduction to laboratory experimentation, with particular emphasis on the collection and use of experimental data, some properties of solutions, stoichiometry, thermochemistry, and synthesis. Credit given for only one of the following: CHEM-C 121, or 125.*

126 Experimental Chemistry II (2 cr.)

Spring. P: CHEM-C 125. C: CHEM-C 106. A continuation of CHEM-C 125 with emphasis on equilibria; qualitative analysis; acids and bases; oxidation-reduction reactions including electrochemistry, chemical kinetics, and synthesis. Credit given for

only one of the following: CHEM-C 126, or 122.*

210 Introduction to Quantitative Analytical Chemistry (3 cr.)

Fall. P: CHEM-C 106, 126. C: CHEM-C 211. Introduction to the theory and practice of non-instrumental quantitative/qualitative analytical chemistry, including sample selection and preparation and methods of data analysis. Emphasis will be placed on the theory of titrimetric and gravimetric techniques.

211 Introduction to Quantitative and Analytical Chemistry Laboratory (2 cr.)

Fall. P: CHEM-C 126. C: CHEM-C 210. Laboratory instruction in the fundamental analytical techniques discussed in CHEM C210.*

310 Analytical Chemistry (3 cr.)

Spring. P: CHEM-C 106. Fundamental analytical processes including solution equilibria, theory and applications of electrochemistry and spectrophotometry, and chemical methods of separation.

311 Analytical Chemistry Laboratory (2 cr.)

Spring. C: CHEM-C 310. Laboratory instruction in the fundamental analytical techniques discussed in CCHEM-C 310.*

351 Green Chemistry & Sustainability Sciences (4 cr.)

P: CHEM-C 343, CHEM-C 344 and junior standing. Green Chemistry, also known as sustainable or environmentally benign chemistry, seeks to minimize waste and energy use, while maximizing the efficiency of resource use and using renewable resources whenever possible. The aim of the course is to produce students with a blend of chemistry skills for a thorough appreciation of the principles and practice of green chemical processing and environmental sustainability. Topics will cover supercritical fluids, ionic liquids, biotransformations, polymers, etc. Focus will be on green organic chemistry, in which labs, such as solventless reactions and liquid carbon dioxide extraction, will be introduced. Lecture and laboratory.*

390 Environmental Science (3 cr.)

Spring. For nonmajors. Exploration of the complex interrelationships among the physical, chemical, biological, cultural, economic, and political forces that shape the global environment. Note: CHEM-C 390 will not count toward a Bloomington or Kokomo chemistry degree.

341 Organic Chemistry I: Lecture (3 cr.)

Fall. P: CHEM-C 106. C: CHEM-C 343 or consent of chemistry undergraduate advisor. Chemistry of carbon compounds; nomenclature; qualitative theory of valence; structure and reactions. Syntheses and reactions of major classes and monofunctional compounds.

342 Organic Chemistry II: Lecture (3 cr.)

Spring. P: CHEM-C 343. C: CHEM-C 344 or consent of instructor. Syntheses and reactions of polyfunctional compounds, natural and industrial products, physical and chemical methods of identification.

343 Organic Chemistry I: Laboratory (2 cr.)

Fall. C: CHEM-C 341. Laboratory instruction in the fundamental techniques of organic chemistry and the use of general synthetic methods.*

344 Organic Chemistry II: Laboratory (2 cr.)

Spring. P: CCHEM-C 343. C: CHEM-C 342. Preparation, isolation, and identification of organic compounds. Emphasis on modern research methods.*

361 Physical Chemistry I (3 cr.)

Fall 2004. Alternate years. P: CHEM-C 106, PHYS-P 202, MATH-M 216. Chemical thermodynamics and kinetics, introduction to statistical thermodynamics.

362 Physical Chemistry II (3 cr.)

P: CHEM-C 361. Introduction to quantum mechanics. Structure and spectra of atoms, molecules, and solids.

400 Chemical Information Sources and Services (1 cr.)

Fall. P: CHEM-C 341. Techniques for the storage and retrieval of chemical information in both printed and computer-readable formats; sources of chemical information, including Chemical Abstracts; development of search strategies; online searching of chemical databases.

409 Chemical Research (1-5 cr.; 10 cr. Max.)

For outstanding students. To be elected only after consultation with the faculty research advisor. Cannot be substituted for any course required in the chemistry major. A research thesis is required.

430 Inorganic Chemistry (3 cr.)

Fall 2004. Alternate years. P: CHEM-C 106. R: CHEM-C 342. Structure and bonding of inorganic compounds, survey of chemistry of nonmetal and metal elements, coordination compounds, organometallic compounds, mechanisms and reactions.

443 Organic Spectroscopy (3 cr.)

Elucidation of molecular structures by use of IR, UV, NMR, mass spectroscopy, and other methods.*

483 Biological Chemistry Lecture (3 cr.)

Spring 2006. Alternate years. P: 18 credit hours of chemistry, including CHEM-C 341. Introduction to structure, chemical properties, and interrelationships of biological substances.

495 Capstone in Chemistry (1 cr.)

P: Senior standing. Independent study, under the supervision of a chemistry faculty member or appropriate academic advisor can be earned by completion of (a) a chemical research project; (b) a library research project in an area of current scientific investigation; (c) a research investigation in industry; or (d) a service activity in university, government, public schools, or other science-related groups or organizations. Students will report the results of their activities in both a formal written report and oral presentation, prepare portfolios of undergraduate work in chemistry, discuss recent scientific literature, and explore chemistry in society. Enrollment in the Capstone in Chemistry requires joint approval of the capstone instructor and the independent project advisor.

Geology

(GEOL-G)

100 General Geology (5 cr.)

Broad study of the earth. The earth in the solar system, earth's atmosphere. Formation and modification of earth materials, landforms, continents and oceans through geologic time.

133 Geology of the United States (5 cr.)

Introduction to physical and historical geology with applications to United States geology. Study of the geologic events (and their associated rocks and structures) that

have shaped the continent, including mountain building, earthquakes, volcanoes, continental drifting, intercontinental seaways, sedimentary environments, glacial geology and modern processes.*

400 Energy: Sources and Needs (3 cr.)

Renewable and non-renewable energy resources, their origins, society's needs and usage, environmental impacts of use and production, and future directions in energy technologies. Also may include study of non-energy resources including metallic and nonmetallic resources.

421 United States Geology: Field Experience 1 – 5 cr.)

A six week lecture/field trip course incorporating a 2 – 3 week field experience in the western United States. Students will explore the geologic events (and their associated rocks and structures) that have shaped the continent, including mountain building, earthquakes, volcanoes, continental drifting, intercontinental seaways, sedimentary environments and glacial geology. Possible destinations include (but are not limited to) the Black Hills, Yellowstone, Grand Tetons, Mt. Rainier, Mt. St. Helens and the Glacier National Park.*

(GEOL -T)

312 Geology of Indiana (3 cr.)

P: GEOL-G 100. Study of the physiography and bedrock structure of Indiana, first with topographic and geologic maps, and then with field trips to selected areas. Rock and fossil specimens will be collected for study.

326 Geology of Mineral Resources (3 cr.)

P: a course in geology or consent of the instructor. Formation of minerals and mineral deposits. Gem materials and metallic and non-metallic economic minerals: occurrence and uses.

Geography (Physical)

(GEOG-G)

107 Physical Systems of the Environment (3 cr.)

Physical environment as the home of humans, emphasizing the distribution and interaction of environmental variables (landforms, vegetation, soils, and climate). Note: Business majors may count GEOG G107 only as a social science.

315 Environmental Conservation (3 cr.)

R: 3 credit hours of geography or junior standing. Conservation of natural resources including soil, water, wildlife, and forests as interrelated components of the environment, emphasizing an ecological approach. Current problems relating to environmental quality.

Physics

(PHYS-P)

100 Physics in the Modern World (5 cr.)

Fall. Ideas, language, methods, impact, and cultural aspects of physics today. Includes classical physics up to physical bases of radar, atomic-energy applications, etc. Beginning high school algebra used. Cannot be substituted for physics courses explicitly designated in specified curricula. No credit in this course will be given to students who have passed PHYS-P 201-202.*

201 General Physics I (5 cr.)

Fall. P: MATH-M 125 or high school equivalent. Newtonian mechanics, oscillations and waves, bulk properties of matter and thermodynamics.*

202 General Physics II (5 cr.)

Spring. P: PHYS-P 201. Electricity and magnetism, geometrical and physical optics, and modern physics.*

301 Contemporary Physics (3 cr.)

Arr. P: PHYS-P 202 or PHYS-P 222; MATH-M 215, which may be taken concurrently with consent of instructor. Introduction to modern physics. Atomic and nuclear physics, kinetic theory, relativity, elementary particles.

310 Environmental Physics (3 cr.)

Arr. P: PHYS-P 201 or consent of instructor. Relationship of physics to current environmental problems. Energy production, comparison of sources and by-products; nature of and possible solutions to problems of noise; particulate matter in atmosphere.

Computer Information Systems**(CSCI-C)****100 Computing Tools (1 cr.)**

An introduction to computing applications useful in college work. Microcomputer systems, word processing, spreadsheets, graphics, e-mail and Web browsers are used.

106 Introduction to Computers and Their Use (3 cr.)

P: CSCI-C 100 or CIS major; (for ACCEL sections: P: CSCI-C 100 and sophomore standing). Introduction to computers and data processing. Includes the historical and current status of data processing and electronic digital computers; a survey of computer applications; foundations of computer programming; survey of programming languages; and the fundamentals of a high-level language such as Visual Basic.

297 Visual Basic with SQL (4 cr.)

P: CSCI-C 106. An intensive introduction to computer programming techniques using Visual Basic. Emphasis on proper program design and documentation. Includes interfacing VB with SQL.

309 Object-oriented Programming (4 cr.)

P: CSCI-C 297 or another programming course. An introduction to object-oriented programming in an OOP language such as C++ or Java. Covers the transition from structured programming to OOP techniques to support encapsulation, inheritance, and polymorphism.

390 Individual Programming Laboratory (1–3 cr.)

Arr. P: junior/senior standing. Students will design, program, verify, and document a special project assignment selected in consultation with their instructor. This course may be taken several times up to a maximum of 6 credit hours. Prior to enrolling, students must arrange for an instructor to supervise their course activity.

445 Information Systems Design (3 cr.)

P: CSCI-C 309. Concepts, theory, and practice in systems design and analysis. Tools of systems analysis used with computer systems to define data flow, control, and process requirements. Includes object-oriented analysis techniques.

(CSCI-Y)**398 Internship in Professional Practice (S/F Grading) (3–6 cr.)**

Arr. P: sophomore standing; approval of major department. Designed to provide opportunities for students to receive credit for selected, career-related, work. Evaluation by employer and faculty sponsor.

(DPIS-D)

250 Multimedia (3 cr.)

P: Intro-level PC skills. Covers the development of CD and graphics-based presentations such as would be made by corporate trainers, system developers, elementary/secondary school teachers, and marketing professionals. Students will use image capture, scanning, and audio capture to create projected presentations in class.

335 Computer Hardware, System Software, and Architecture (3 cr.)

P: CSCI-C 297. A functional, systems-level review of computing equipment and the organization of components and devices into architectural configurations. The principles of system software, operating system design, and components as they relate to the coordinated functioning of a computer.

345 Database Systems Management and Design (3 cr.)

P: CSCI-C 297. The theory and practice of database management systems (DBMS); information management; database models hierarchical, network, relational; distributed processing; database administration, design, evaluation, acquisition, and implementation; use of DBMS by analysts, programmers, and end users. Database used is Oracle.

490 Current Directions in Data Processing and Information Systems (3 cr.)

P: CSCI-C 309. A survey of current computer systems, and an examination of state-of-the-art applications that significantly improve workplace productivity. Students will investigate one area in depth.

INFORMATICS

(INFO-I)

100 First Year Experience (1 cr)

This course introduces specific survival skills for success in college and beyond, while reconciling personal learning skills with instructor-based teaching styles. Master the art of inquiry and elevate your sense of integrity while sharpening your personal edge by exploring critical thinking, project managements and current/future job market trends.

101 Introduction to Informatics (4 cr)

P: Computer literacy. Problem solving with information technology; introductions to information representation, relational databases, system design, propositional logic, cutting-edge technologies: CPU, operation systems, networks; laboratory emphasizing information technology including Web page design, word processing databases, using tools available on campus.

201 Mathematical Foundations of Informatics (4 cr)

P: INFO-I 101 and MATH-M 118. An introduction to methods of analytical, abstract and critical thinking, deductive reasoning, and logical and mathematical tools used in information sciences. The topics include propositional and predicate logic, natural deduction proof system, sets, functions and relations, proof methods in mathematics, mathematical induction, and graph theory. Credit given for either INFO-I 201 or COGS-Q 250.

202 Social Informatics (3 cr)

P: INFO-I 101. Introduction to key social research perspectives and literatures on the use

of information and communication technologies. Discusses current topics such as information ethics, relevant legal frameworks, popular and controversial uses of technology (e.g., peer-to-peer file sharing), digital divides, etc. Outlines research methodologies for social informatics.

210 Information Infrastructure I (4 cr)

Recommended prerequisite or concurrent: INFO-I 101. The software architecture of information systems. Basic concepts of systems and applications programming. Cross listed with CSCI-C 309. Credit given for only one of the following: INFO-I 210, CSCI-N 331 (IUPUI), or CSCI-A 201 (IUB).

211 Information Infrastructure II (4 cr)

P: INFO-I 210. The systems architecture of distributed applications. Advanced programming, including and introduction to the programming of graphical systems. Cross listed with CSCI-C 309. Credit given for only one of the following: INFO-I 211, CSCI-N 345 (IUPUI), CSCI-A 202 (IUB), or CSCI-C 212 (IUB).

213 Web Site Design and Development (3 cr)

Introduction to web design and development covering high-level concepts in addition to hands-on activities. Topics include: internet infrastructure, client-side technologies, embedded media, page design, site design, visibility and others. Technologies covered include: XHTML, JAVA script and cascading style sheets.

300 Human Computer Interaction (3 cr)

The analysis of human factors and the design of computer application interfaces. A survey of current HCI designs with an eye toward what future technologies will allow. The course will emphasize learning HCI based on implementation and testing interfaces.

303 Organizational Informatics (3 cr)

P: INFO-I 101. Examines the various needs, uses, and consequences of information in organizational contexts. Topics include organizational types and characteristics, functional areas and business processes, information-based products and services, the use of and redefining role of information technology, the changing character of work life and organizational practices, sociotechnical structures, and the rise and transformation of information-based industries.

308 Information Representation (3 cr)

P: INFO-I 101, INFO-I 201, and INFO-I 210. The basic structure of information representation in digital information systems. Begins with low-level computer representations such as common character and numeric encodings. Introduces formal design and query languages through Entity Relationship Modeling, the Relational Model, XML, and XHTML. Laboratory topics include SQL and XPath querying.

450/451 Design and Development of an Information System (3 cr/3 cr)

P: Approval of the dean and completion of required core informatics courses. Students work on capstone projects in supervised teams. They select an appropriate project (preferably based on cognate), then learn to develop a plan that leads to success. Teamwork, communication, and organizational skills are emphasized in a real-world-style environment.

I460/I461 Senior Thesis (3/3 cr.) P: Senior standing and approval of the dean. The senior student prepares and presents a thesis: a substantial, typically multichapter paper based on a well-planned research or scholarly project, as determined by the student and a sponsoring faculty member.

Mathematics

(Math-K)

310 Statistical Techniques (3 cr.)

Fall, Spring. P: MATH-M 125 or 118 or MA 153

Introduction to probability and statistics; elementary probability theory, conditional probability, independence, random variables, discrete and continuous probability distributions, measurement of central tendency and dispersion. Concepts of statistical inference and decision: estimation, hypothesis testing, Bayesian inference, statistical decision theory. Special topics discussed may include regression and correlation, time series, analysis of variance, nonparametric methods. Credit given for only one of the following: PSY-K 300, ECON-E 270, MATH-K 310 or STAT 301.

(Math-M)

003 Algebra Skills Recovery Lab (0 cr.)

A course designed for students who successfully completed at least Algebra I in high school. It provides these students with the opportunity to refresh their algebra skills prior to enrolling in MATH-M 117, MATH-M 118, MATH-M 119 or MATH-M 125. The course is computer-based with required class meetings for discussion and testing.

007 Elementary Algebra (3 cr.)

Fall, Spring. Signed numbers, operations with polynomials, solving equations, factoring, introduction to graphing, fractional and radical expressions. Not open to students who have had M014. Credit may not be applied toward any degree.

117 Intermediate Algebra (3 cr.)

Fall, Spring. P: MATH-M 007 or equivalent. R: C- or above in MATH-M 007.

Factoring, rational expressions, fractional exponents, radicals, quadratic equations, and functions. Does not count toward the arts and sciences divisional distribution requirements.

118 Finite Mathematics (3 cr.)

Fall, Spring. P: two years of high school algebra or MATH-M 117. R: a grade of C- or better in MATH-M 117 or equivalent. Set theory, linear systems, matrices and determinants, probability, linear programming. Applications to problems from business and the social sciences.

119 Brief Survey of Calculus I (3 cr.)

Fall, Spring. P: two years of high school algebra or MATH-M 125 or equivalent. R: a grade of C- or better in MATH-M 125 or equivalent. Introduction to calculus. Primarily for students in the social sciences. Not open to those who have had MATH-M 211 or 215.

120 Brief Survey of Calculus II (3 cr.)

Fall, Spring. P: MATH-M 119. R: a grade of C- or above in MATH-M 119. A continuation of MATH-M 119, covering topics in elementary differential equations, calculus of functions of several variables and infinite series. Intended for non-physical science students. Credit not given for both MATH-M 216 and 120. Knowledge of trigonometry required.

125 Precalculus Mathematics (3 cr.)

Fall, Spring. P: MATH-M 117. R: a grade of C– or better in MATH-M 117 or equivalent. Designed to prepare students for calculus. Algebraic operations, polynomials, functions and their graphs, conic sections, linear systems of equations. Does not count toward the arts and science divisional distribution requirements. Credit not given for both MATH-M 125 and MATH-M 015 and 017.

126 Trigonometric Functions (3 cr.)

Fall, Spring. P: MATH-M 125. Designed to develop the properties of the trigonometric, exponential, and logarithmic functions and to prepare for courses in calculus (MATH-M 211 or 215). Credit not given for both MATH-M 125 and 015 and 017.

215–216 Calculus I–II (5–5 cr.)

Fall, Spring. P: two years of high school algebra and trigonometry, or both MATH-M 125 and 126. Coordinates, functions, straight line, limits, continuity, derivative and definite integral, applications, circles, conics, techniques of integration, infinite series. MATH-M 215 not open to those who have had MATH-M 119 or 211. A student cannot receive credit for both MATH-M 131 and 215, 119 and 215, 211 and 215, or 120 and 216 and MATH-M 212 and 216.

303 Linear Algebra for Undergraduates (3 cr.)

P: MATH-M 216 or consent of instructor. Introduction to theory of real and complex vector spaces. Coordinate systems, linear dependence, bases. Linear transformations and matrix calculus. Determinants and rank. Credit not given for both MATH-M 301 and 303.

311 Calculus III (3 cr.)

P: MATH-M 216 or consent of instructor. Elementary geometry of 2, 3, and n-space; functions of several variables; partial differentiation; minimum and maximum problems; and multiple integration.

313 Elementary Differential Equations with Applications (3 cr.)

P: MATH-M 216 or consent of instructor. Ordinary differential equations of first order and linear equations of higher order with applications, series solutions, operational methods, Laplace transforms, and numerical techniques. A student may not receive credit for both MATH-M 313 and 343.

347 Discrete Mathematics (3 cr.)

P: MATH-M 212 or MATH-M 216. Injective and surjective functions; inverse functions; composition; reflexive, symmetric, and transitive relations; equivalence relations; sets including complements, products, and power sets; cardinality; introductory logic including truth tables and quantification; elementary techniques of proof including induction and recursion; counting techniques; graphs and trees; discrete probability.

360 Elements of Probability (3 cr.)

P: MATH-M 216. C: MATH-M 311. Introduction to mathematical theory of probability. Probability models, combinatorial problems, conditional probability and independence, random variables, discrete and continuous distributions, repeated Bernoulli trials, gambler's ruin problems, moments, moment generating functions, law of large numbers, central limit theorem, and applications.

366 Elements of Statistical Inference (3 cr.)

P: MATH-M 360. Sampling distributions (Chi square, t and F distributions), order statistical decisions, and inference. Hypothesis-testing concepts, Neyman-Pearson

Lemma, likelihood ratio tests, power of tests. Point estimation, method of moments, maximum likelihood, Cramer-Rao bound, properties of estimators. Interval estimation, applications. Regression, correlation, analysis of variance, nonparametric methods.

403–404 Introduction to Modern Algebra I–II (3–3 cr.)

P: MATH-M 301 or 303. Study of groups, rings, fields (usually including Galois theory), with applications to linear transformations.

413–414 Introduction to Analysis I–II (3–3 cr.)

P: MATH-M 301 or 303, and 311, or consent of instructor. Modern theory of real number system, limits, functions, sequences and series, Riemann-Stieltjes integral, and special topics.

415 Elementary Complex Variables with Applications (3 cr.)

P: MATH-M 311. Algebra and geometry of complex numbers, elementary functions of a complex variable, power series, integrations, calculus of residues, conformal mapping. Application to physics.

447–448 Mathematical Models and Applications I–II (3–3 cr.)

P: MATH-M 301 or 303, 311, and 360, which may be taken concurrently, or with consent of instructor. Formation and study of mathematical models used in the biological, social, and management sciences. Mathematical topics include games, graphs, Markov and Poisson processes, mathematical programming, queues, and equations of growth. Suitable for secondary school teachers.

471–472 Numerical Analysis I–II (3–3 cr.)

P: MATH-M 301 or 303, 313 or 343, and 311, or consent of instructor. R: CSCI-C 301 or FORTRAN programming. Interpolation and approximation of functions, numerical integration and differentiation, solution of nonlinear equations, acceleration and extrapolation, solution of systems of linear equations, eigenvalue problems, initial and boundary value problems for ordinary differential equations, and computer programs applying these numerical methods.

(Math-T)

109 Mathematics for Elementary Education I (3 cr.)

Fall, Spring. P: MATH-M 118 or MATH-M 125. Introduction to problem-solving, including use of patterns and Venn diagrams; study of various numeration systems; whole numbers, fraction, and decimal algorithms with manipulatives; ratio; percent; logic. Open only to elementary education majors. Does not count towards divisional distribution requirement.

110 Mathematics for Elementary Education II (3 cr.)

Fall, Spring. P: MATH-M 118 or MATH-M 125. Emphasis on geometry with use of manipulatives; study of plane figures and solids. Discussion of area, volume, symmetry, perimeter, tessellation, constructions with mira and compass, congruence, similarity, probability, statistics. Open only to elementary education majors. Does not count toward divisional distribution requirement.

336 Topics in Euclidean Geometry (3 cr.)

P: MATH-M 301 or 303 and 391 or their equivalents. Axiom systems for the plane, the parallel postulate and non-Euclidean geometry, classical theorems. Geometric transformation theory, vectors and analytic geometry, convexity, theory of area and volume.

Mathematics (Purdue courses)

(MA)

153 Algebra and Trigonometry I (3 cr.)

Fall, Spring. R: A grade of C- or better in MATH-M 117 or equivalent. Algebra for students with inadequate preparation for calculus. This is the first half of a two-semester version of MA 151. Not open to students with credit for MA 151.

154 Algebra and Trigonometry II (3 cr.)

Fall, Spring. P: MA 153 or equivalent. Trigonometry for students with inadequate preparation for calculus. This is the second half of a two-semester version of MA 151. Not open to students with credit for MA 151.

221 Calculus for Technology I (3 cr.)

Fall. P: MA 153 or equivalent. R: a grade of C- or better in MA 153 or MA 154 or equivalent. Not open to students with credit in MATH-M 119. First course in techniques of calculus for students enrolled in certain technical curricula.

222 Calculus for Technology II (3 cr.)

Spring. P: MA 221. R: a grade of C- or better in MA 221 or equivalent. Not open to students with credit in MA 224 or MATH-M 120. Continuation of MA 221. Knowledge of trigonometry required.

Statistics (Purdue course)

(STAT)

301 Elementary Statistical Methods I (3 cr.)

Fall, Spring. P: MATH-M 125 or 118 or MA 153. A basic introductory statistics course with applications shown to various fields and emphasis placed on assumptions, applicability, and interpretations of various statistical techniques. Subject matter includes frequency distribution, descriptive statistics, elementary probability, normal distribution, applications, sampling distribution, estimation, hypothesis testing, and linear regression.