



# Programs & Courses of Instruction

Academic concentrations leading to majors and degrees are listed alphabetically in this catalog. Requirements and recommendations are explained under each heading. Students are responsible for observing these directives to the satisfaction of the major department.

**Course Credit.** Courses are equivalent to three semester hours of credit except where noted.

**Prerequisites.** A prerequisite is a course or its equivalent that normally must be taken and passed before admission to a given course can be approved. Prerequisites are listed at the end of the course description where needed.

**Cross-Listed Courses.** Numbers in parentheses after a course number indicate that the course is cross-listed in a second department.

**Course Numbering.** Courses are numbered in this way:

090-099	Strengthening courses.
100-199	Lower-division or introductory courses. (In some cases, these may be taken by upperclassmen.)
200 and above	Upper-division courses.
300-489	Upper-division courses, usually taken by majors.
490-499	Usually taken by accelerated undergraduate or graduate students.
500-699	Graduate-level courses.

**Special Courses.** In addition to course offerings listed on the following pages, each discipline's curriculum includes four unlisted courses, offered whenever the need arises. They are numbered in this way:

161, 261, 361, 461	Experimental course offering (one time only)
171, 271, 371, 471	Readings
172, 272, 372, 472	Independent Study
273, 274, 373, 374, 473, 474	Internships

Tutorials (courses listed in the catalog but not offered in a particular semester) often can be taken by special arrangement.

## Typical Course Distribution

The schedules printed with each major offer an idea of how courses might be distributed over four years. Since exceptions and variations are likely to occur, some rearrangement is inevitable. In many major concentrations, it is advisable to begin the major in the freshman year; such is not possible, however, when the major has prerequisites in the core curriculum. Students who plan to spend a semester or year elsewhere will have to arrange their schedules accordingly.

While the normal student course-load is five courses each semester, some programs will require a fuller load from time to time.

## Subject Symbols

The following abbreviations are used throughout the catalog:

ABR	Abroad Study
ACC	Accountancy
ATH	Athletics
BIO	Biology
BUS	Business
CHE	Chemistry
CLS	Clinical Science
CRJ	Criminal Justice
CSC	Computer Science
CST	Catholic Studies
ECO	Economics
ENG	English
ENV	Environmental Studies
FAS	Fine Arts
FIN	Finance
FRE	French
GER	German
GSC	General Science
HIS	History
HON	Honors
INB	International Business
INS	International Studies
LIT	Literature
MAT	Mathematics
MGT	Management
MKT	Marketing
MOL	Modern Language
NME	Nuclear Medicine Technology
NUR	Nursing
PEP	Political and Economic Philosophy
PHI	Philosophy
PHY	Physics
POS	Political Science
PSY	Psychology
PWR	Professional Communication
RET	Respiratory Therapy
RST	Theology/Religious Studies
SPA	Spanish
SSC	Social Science
TEC	Technology
TPP	Teacher Preparation
WST	Women's Studies

## Accounting

(See description of Accounting courses in the Business section, p. 33)

## Athletics

Contact Person: *Gerald W. DeFruscio*

WJU is committed to offering its students a strong liberal arts education. A physical education program will help them maintain a high level of fitness in their lives. There are obvious and increasingly recognized health reasons why physical conditioning is important.

## Biology

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The following major programs are offered in Biology:

1. Biology
2. General Science (Biology)
3. Environmental Studies

## Core Fulfilling Courses

- BIO 105 The Process of Biology
- BIO 115 General Biology I
- BIO 120 General Biology II
- BIO 128 Human Anatomy and Physiology I

## Biology

Biology is the study of life. The biology curriculum aims at awakening the student's interest in the living world, developing scientific habits in pursuing knowledge of the world and training in biological science in preparation for careers in medicine, dentistry, pharmacy, research, teaching and other biological vocations.

### Requirements for Biology Major Bachelor of Science Degree

Upon completion of the Biology program, students will be able to demonstrate the ability to:

1. Understand the principles & concepts fundamental to biology.
2. Apply laboratory techniques appropriate for entry level biologists.
3. Develop problem-solving skills.
4. Be proficient in oral and written communication.

(continued)

### BIOLOGY - Recommended Course Sequence

	Freshman		Sophomore		Junior		Senior	
<b>FALL</b>	BIO 115 & 121	4	BIO 205 & 221	4	BIO 340 & 341	4	RST - Elective	3
	CHE 110 & 121	5	BIO 210 & 222	4	LIT 250	3	BIO 475	1
	MAT 108 or 111	3	CHE 221 & 231	5	PHY 110 & 121	5	FAS 2XX	2
	FYS 101	1	MOL 102	3	BIO 375	2	BIO 480	1
	HIS 110	3			FAS 101	1	BIO 424	1
							BIO Elective 2XX	3
<b>SPRING</b>							SSC Elective	3
							PHI 205	3
	Semester total	16		16		15		17
	BIO 120 & 122	4	BIO 320 & 321	4	BIO 330 & 331	4	BIO 482	2
	CHE 120 & 122	5	CHE 222 & 232	5	PHI 105	3	RST/PHI 305	3
	ENG 105 or 110	3	LIT 120	3	PHY 120 & 122	5	Global Persp.	3
HIS 120	3	MOL 111	3	RST 106/107	3	BIO 426	1	
				BIO 376	1	BIO Elective 4XX	3	
						MAT/CSC	3	
Semester total	15		15		16		15	
Total Credits	31		31		31		32	125

In addition to completing the core curriculum requirements, outlined on pp. 15-16 of this catalog, biology majors must complete the following courses:

BIO 115, 121	General Biology I and Lab	(3 and 1 crs)
BIO 120, 122	General Biology II and Lab	(3 and 1 crs)
BIO 205, 221	Ecology and Ecology Lab	(3 and 1 crs)
BIO 210, 222	Genetics and Genetics Lab	(3 and 1 crs)
BIO 320, 321	Vertebrate Biology and Lab	(3 and 1 crs)
BIO 330, 331	Developmental Biology and Lab	(3 and 1 crs)
BIO 340, 341	Cellular & Molecular Biology and Lab	(3 and 1 crs)
BIO 375, 376, 475	Special Projects	(1 cr ea)
BIO 424, 426	Advanced Physiology Lab and Advanced Molecular Lab	(1 cr ea)
BIO (400 level)	Advanced Biology Elective Course	(3 crs)
BIO (200 level or above)	Biology Elective	(3 crs)
BIO 480, 482	Biology Seminars	(1 and 2 crs)
CHE 110, 120	General Chemistry I, II	(4 crs ea)
CHE 121, 122	General Chemistry Labs I, II	(1 cr ea)
CHE 221, 222	Organic Chemistry	(4 crs ea)
CHE 231, 232	Organic Chemistry Labs	(1 cr ea)
PHY 110, 120	Physics I, II	(4 crs ea)
PHY 121, 122	Physics Labs I, II	(1 cr ea)
Two Math/Computer Science courses		(3 or 4 crs ea)
		<u>(81 or 82 crs)</u>

## Requirements for General Science Major (Biology) Bachelor of Science Degree

Upon completion of the General Science (Biology) program, students will be able to demonstrate the ability to:

1. Understand the principles and concepts fundamental to science, with an emphasis in biology.
2. Utilize laboratory techniques appropriate for a person knowledgeable in science.
3. Develop problem-solving skills in science and related areas of inquiry.
4. Be proficient in oral and written communication skills.

The General Science Biology major is designed to complement the Teacher Preparation Program, providing an excellent background for secondary education in biology. Alternatively, this major could be combined with a marketing or professional writing minor to provide training for a non-traditional, science-related career.

The General Science Biology major does not meet the requirements for traditional biology or health-related careers.

In addition to completing the core curriculum requirements, outlined on pp. 15-16 of this catalog, General Science (Biology) majors must complete the following courses:

BIO 115, 121	General Biology I and Lab	(3 and 1 crs)
BIO 120, 122	General Biology II and Lab	(3 and 1 crs)
BIO 205, 221	Ecology and Lab	(3 and 1 crs)
BIO 210, 222	Genetics and Lab	(3 and 1 crs)
BIO 320, 330	Vertebrate & Developmental Biology	(3 crs ea)
BIO 321	Vertebrate Lab	(1 cr)

### GENERAL SCIENCE (BIOLOGY) - Recommended Course Sequence

	Freshman		Sophomore		Junior		Senior		
<b>FALL</b>	BIO 115 & 121	4	BIO 205 & 221	4	BIO 340 & 341	4	RST Elective	3	
	CHE 110 & 121	5	BIO 210 & 222	4	BIO 480	1	SSC Elective	3	
	ENG 105 or 110	3	CHE 221	4	RST 106/107	3	Electives	6	
	FYS 101	1	MAT 108 or 111	3	PHY 110 & 121	5	FAS 2XX	2	
	HIS 110	3			MOL 111	3	BIO 480	1	
	Semester total	16		15		16		15	
<b>SPRING</b>	BIO 120 & 122	4	BIO 320 & 321	4	BIO 330 & 331	4	SSC POS Elective	3	
	CHE 120 & 122	5	CHE 222	4	PHY 120 & 122	5	RST/PHI 305	3	
	LIT 120	3	PHI 105	3	PHI 205	3	LIT 120	3	
	HIS 120	3	MOL 102	3	Elective	3	Electives	6	
			FAS 101	1					
	Semester total	15		15		15		15	
	Total Credits	31		30		31		30	122

BIO 340, 341	Cellular & Molecular Biology & Lab	(3 and 1 crs)
BIO 480	Seminar	(1 cr)
CHE 110, 120, 121, 122	General Chemistry and Labs	(10 crs)
CHE 221, 222	Organic Chemistry Lecture	(8 crs)
PHY 110, 120,	Physics I, II	
PHY 121, 122	Physics Lab I, II	(10 crs)
		(53 crs)

### Requirements for a Minor in Biology

Biology minors must complete BIO 115, 120, 121, 122, 205, 210, 221, 222 and the following lecture and lab combinations (320, 330, 340, 341 and 321).

## Course Descriptions

### BIO 105 The Process of Biology (3 crs)

*(meets the first core science requirement).*

An introduction to biology as a way of knowing and communicating about living systems. The themes are how living systems process energy and information, relate ecologically to their environments and evolve over time. The goal is scientific literacy, i.e., skill in applying theories, evaluating evidence and manipulating concepts.

### BIO 110 Biology of Reproduction (3 crs)

Reproduction is an impelling force in all biological organisms. This course investigates the processes and strategies of propagation, with major emphases on its evolution and meaning in the human race.

### BIO 115 General Biology I (3 crs)

An exploration of variations on the themes of biology: metabolism, phylogeny, development, systematics, anatomy and physiology of plants and animals, animal behavior, etc.

### BIO 120 General Biology II (3 crs)

*(A continuation of BIO 115)*

An exploration of variations on the themes of biology: metabolism, phylogeny, development, systematics, anatomy and physiology of plants and animals, animal behavior, etc.

### BIO 121 The Methods of Biology (1 cr)

*(Should be taken by prospective science majors)*

Intensive training in laboratory techniques in cell biology, microscopy, genetics, enzymology, biological chemistry, with computer applications.

### BIO 122 General Biology II Laboratory (1 cr)

Mammalian dissection, taxonomic identifications, systematic survey of the five kingdoms, ecological studies, etc.

### BIO 127 Anatomy Lab (1 cr)

Laboratory dissection of the organ-systems of the cat with supportive dissections of some other animal organs such as the heart, brain and kidney. Structures of the organ-systems will be related to human structures. Corequisite: BIO 128.

### BIO 128 Human Anatomy and Physiology I (3 crs)

The first course in a two course series that examines the anatomy and physiology of the human body. This course begins with the study of the levels of structural organization and proceeds with an indepth study of the integumentary, musculoskeletal, nervous and endocrine systems.

### BIO 129 Human Anatomy and Physiology II (3 crs)

The second in a two course series that examines the anatomy and physiology of the human body. This course provides an indepth study of the cardiovascular, lymphatic, respiratory, digestive, urinary and reproductive systems. Prerequisite: BIO 128.

### BIO 205 Ecology (3 crs)

An introduction to basic ecology. Topics include natural selection and speciation, energy flow, nutrient cycling, population dynamics, community succession and biomes. Prerequisite: Any other Biology course.

### BIO 221 Ecology Laboratory (1 cr)

Field application of various ecological principles with overriding themes of succession and ecosystem diversity. Field trips are required. Corequisite: BIO 205. Prerequisite: Any other BIO course.

### BIO 210 Genetics (3 crs)

A thorough familiarization with the principles of classical genetics of representative organisms of all kingdoms and especially of humans. Function of genes in developmental systems is emphasized. Special topics include consideration of ethical issues. Prerequisite: Completion of a core course in mathematics and any other biology course.

### BIO 222 Genetics Laboratory (1 cr)

Practical and computer experiments in the analysis of heredity.

### BIO 232 Histology (3 crs)

Microscopic anatomy of vertebrates tissues with an emphasis on the tissues of mammals. Prerequisite: Any other BIO course.

### BIO 233 Histology Laboratory (1 cr)

Microscopic study of tissues from the major organ-systems of a mammal. Students will prepare their study slides from supplied specimen. Corequisite: BIO 232.

### BIO 234 (CLS 234) Pathophysiology (3 crs)

A survey of disease processes which affect tissues, organs, or the body as a whole. Prerequisites: BIO 128 and BIO 129.

### BIO 235 Parasitology (3 crs)

A survey of common human parasites from the following phyla: protozoa, platyhelminthes and nematoda. Important aspects of their anatomy, physiology, life cycles, epidemiology and control will be discussed. Prerequisite: Any other BIO course.

### BIO 236 Parasitology Lab (1 cr)

Laboratory identification of common human parasites that are representative of the various genera discussed in the lecture. Corequisite: BIO 235.

### BIO 237 Plant Morphology and Physiology (3 crs)

Study of the structure and function of selected types of plants. Includes propagation techniques such as tissue culture. Prerequisites: BIO 120.

**BIO 240 Microbiology (3 crs)**

Classification and major characteristics of viruses, bacteria and other protists, microbial metabolism and genetics. Prerequisite: Any other BIO course.

**BIO 241 Microbiology Laboratory (1 cr)**

Practical experiences with various bacteria, fungi and parasites emphasizing nutritional requirements and growth habits. Corequisite: BIO 240.

**BIO 242 Cardiopulmonary Physiology (3 crs)**

Advanced physiology of the cardiovascular and pulmonary systems. Topics include conductive tissues of the heart, ECG interpretation, blood pressure regulation, gas exchange and transport, breathing regulation, respiratory insufficiency and congenital abnormalities. Prerequisite: BIO 128 and BIO 129.

**BIO 244 Invertebrate Biology (3 crs)**

An advanced study of representatives of the invertebrate phyla. Includes morphology, physiology, life history and systems. Prerequisites: Any other BIO course.

**BIO 272 Animal Nutrition (3 crs)**

The dietary needs, including vitamins, minerals and processing of foodstuffs, by selected mammals, including humans. Deficiency disease and tolerances also included.

**BIO 290 Neuroanatomy/Physiology (3 crs)**

An introductory course to basic and applied neurological principles. Course includes mastery of the nervous system, terminology and neuroanatomical relationships; neurophysiological at the cellular and at the system level; major functions of the central, peripheral and autonomic nervous systems and how these systems interact to produce appropriate responsiveness to environmental demands. Prerequisites: BIO 128.

**BIO 314 Biochemistry (3 crs)**

A basic course which develops concepts necessary for a description of macromolecular structure, biological regulatory processes and chemical biodynamics. Prerequisite: CHE 222.

**BIO 320 Vertebrate Biology (3 crs)**

An in-depth study of the comparative anatomy and systematic physiology of the vertebrate organisms with emphasis on evolutionary relatedness. Prerequisite: Any 200 level BIO course.

**BIO 321 Vertebrate Biology Laboratory (1 cr)**

Experimental, observational and comparative study of the structure and function of organ systems in vertebrates. Corequisite: BIO 320.

**BIO 330 Developmental Biology (3 crs)**

A detailed study of the mechanisms of development from gametogenesis through organogenesis, with particular emphasis on gene action, induction, cell movements and adhesions and pattern development. Special topics such as regeneration and cancer will be discussed. Prerequisite: Any 200 level BIO course.

**BIO 331 Developmental Biology Laboratory (1 cr)**

Includes embryology and experimental study of the principles of development in selected invertebrates, amphibians, avians and mammals. Corequisite: BIO 330.

**BIO 340 Cellular and Molecular Biology (3 crs)**

Physical and chemical processes and the ultrastructure underlying functional activities of both plant and animal cells; aspects of molecular biology, cytogenetics and immunology. Prerequisite: BIO 115, 120; CHE 221, CHE 222.

**BIO 341 Cellular and Molecular Biology Laboratory (1 cr)**

Extensive use of basic and advanced instrumentation and development of laboratory skills in the physiological and biochemical study of the activities of cells, organelles and macromolecules of microorganisms and tissue preparations of large animals and plants. Emphasis placed on evaluation and interpretation of lab data, correlation with library research and presentation in scientific report format. Corequisite: BIO 340.

**BIO 344 Instructional and Research Techniques (3 crs)**

Use of research and instructional equipment techniques for preparing research and instructional materials and reagents; techniques for obtaining and analyzing data. Prerequisite: Any 200 level BIO course.

**BIO 375 Special Project: Biostatistics and Experimental Design (1 cr)**

Includes preparation for an independent research project including literature review, organization of a protocol with planned statistical treatments of data and seminar participation. Selection of a project will be with the consent and guidance of faculty. Prerequisites: Junior standing.

**BIO 376 Special Project: Instrumentation and Data Acquisition (1 cr)**

Continuation of an independent research project including modification of the protocol, testing materials and methods, commencement of data collection and seminar participation. Continuation of BIO 375.

**BIO 420 Toxicology (3 crs)**

General principles of toxicology, including dose response mechanisms, metabolism of toxic substances and their distribution; toxic substances as carcinogens, mutagens and teratogens; and systemic toxicology will be covered. Prerequisite: BIO 340.

**BIO 424 Advanced Physiology Laboratory (1 cr)**

Application of physiological principles and use of equipment commonly used in medical and allied health professions. Prerequisite: BIO 320, 340.

**BIO 426 Advanced Molecular Biology Laboratory (1 cr)**

Advanced experimental techniques in cellular and molecular biology including gene cloning and tissue culture. Prerequisite: BIO 341.

**BIO 430 Advanced Animal Physiology (3 crs)**

Advanced electrophysiology of selected animal types with emphasis on neural, renal and cardiopulmonary physiology. Prerequisite: BIO 320.

**BIO 436 Physiological Ecology (3 crs)**

Application of ecological principles to problem solving at the organismal, population and ecosystem levels. Emphasis placed on human interactions with topics including organismal response to stressors, human population dynamics, ecosystem response to disturbance and global environmental change. Prerequisites: BIO 205 and BIO 221.

**BIO 437 Physiological Ecology Laboratory (1 cr)**

Field and laboratory exercises including measurements of the chemical, physical and biological attributes of forest, stream, lake, wetland and mesocosm ecosystems. One weekend field trip is required in addition to regularly scheduled outings. Students will design and conduct an individual research project. Prerequisite: BIO 221.

**BIO 450 Molecular Genetics (3 crs)**

The gene as a biochemical entity is examined with regard to its composition and action. Recent evidence from viruses, bacteria and eukaryotes, including humans, is synthesized to gain an understanding of the regulation of the activities of life. Prerequisite: BIO 340.

**BIO 455 Population Genetics (3 cr)**

Genetic analysis of population ecology. Polymorphism, speciation, mutation, inbreeding migration, selection, etc., are considered in the light of evolutionary change. Emphasis on quantitative models of the in the gene pool. Prerequisite: BIO 210.

**BIO 475 Special Project: Data Analysis (1 cr)**

Continuation of an independent research project including completion of testing and statistical treatment of data, preparation of a rough draft of the entire project, a poster presentation and seminar participation. Continuation of BIO 376.

**BIO 480 Literature Seminar (1 cr)**

Presentation of a primary literature article related to student's research project. Participation in all seminars. Prerequisite: junior or senior standing.

**BIO 482 Research Seminar (2 crs)**

Oral and written presentation, in scientific format, reporting on an original research project undertaken by the student. Prerequisite: BIO 480.

# Business

Consistent with the mission of Wheeling Jesuit University, the purpose of business education is to contribute to the development of people prepared for productive and socially responsible lives and for leadership in the world of business. The business curriculum consists of both a broad exposure to the arts and sciences and a comprehensive education in business.

The business program is geared to provide a basic understanding of the nature and purpose of business and its role in society and a general knowledge of the structure and processes of business. The curriculum includes courses in accounting, finance, marketing, management, economics and ethics, among others. It focuses on analytical skills and the constantly growing array of software applicable to business. It also addresses the dynamic global social, political, economic and technical environments in which business operates.

Communication, leadership and analytical skills and experience in working effectively in teams, all qualities required for success in business, are fundamental elements of the program.

Instruction is provided by faculty with extensive experience in business and related fields. Instruction is enhanced by applicable technologies. Internships and other experiential exposures are integral to the business curriculum.

Graduates with degrees in business will be prepared to:

- find career opportunities in business
- contribute in all major functional areas of a business
- recognize and deal with issues of ethical and social responsibility in business
- be proficient in oral and written communication
- be competent in the use of computers and standard software

## The Business Department Majors

The business department offers a major in business, which leads to the bachelor of science degree in business and a major in accountancy, which leads to the bachelor of science degree in accountancy.

## The University Core Curriculum

All majors in business and in accountancy must complete the University core curriculum, including specifically:

ECO 110	Macroeconomics	(3 crs)
MAT 105	Statistics	(3 crs)
INS 111	World Community	(3 crs)

## The Business Core Curriculum

All majors in business and in accountancy must complete the business core curriculum:

ACC 123	Principles of Accounting I	(3 crs)
ACC 124	Principles of Accounting II	(3 crs)
ECO 221	Microeconomics	(3 crs)
FIN 211	Principles of Finance	(3 crs)
MGT 111	Principles of Management	(3 crs)
MKT 211	Principles of Marketing	(3 crs)
BUS 221	Quantitative Business Analysis	(4 crs)
BUS 313	Information Systems and Operations	(3 crs)
BUS 315	Business Law	(3 crs)
BUS 410	Strategic Business Planning	(3 crs)
BUS 100, 200, 300, 400	Business Skills	(1 cr./yr.)

## Requirements for Major in Business Bachelor of Science Degree

In addition to completing the University core curriculum and the business core curriculum, all business majors must complete at least one concentration.

## The Business Concentrations

### Concentration in Management

Required:

MGT 226	Organizational Behavior	(3 crs)
MGT 331	Organizational Communication	(3 crs)
MGT 340	Organizational Leadership	(3 crs)
MGT 436	Human Resources Management	(3 crs)

Plus one of the following:

FIN 316	Principles of Investments	(3 crs)
MGT 311	International Business	(3 crs)
MGT 330	Introduction to e-Commerce	(3 crs)
MGT 373/4	Internship in Management	(3 crs)

### Concentration in Marketing

Required:

MKT 316	Consumer Behavior	(3 crs)
MKT 310	Marketing Research	(3 crs)
MKT 323	Marketing and e-Commerce	(3 crs)
MKT 420	Marketing Strategies	(3 crs)

Plus one of the following:

MKT 317	Services Marketing	(3 crs)
MKT 313	Advertising Management	(3 crs)
MKT 315	International Marketing	(3 crs)
MKT 373/4	Internship in Marketing	(3 crs)

### Concentration in International Business

Required:

MGT 311	International Business	(3 crs)
MKT 315	International Marketing	(3 crs)
FIN 318	International Finance	(3 crs)
BUS 489	Global Economic Development	(3 crs)

Plus one of the following:

FRE/SPA/GER 220	Culture and Communication	(3 crs)
FRE/SPA/GER---	Two upper level courses in a Romance Language	(6 crs)
INB 473/474	International Internship*,**	(3 crs)
MKT 373/4	Internship in Marketing	(3 crs)

Plus one of the following:

POS 211	Comparative Politics	(3 crs)
POS 333	Global Political Economy	(3 crs)

\* A semester-long study abroad, preferably with an internship, is strongly recommended.

\*\* An internship with a US company is recommended for international students.

### Note for Business Majors:

Seniors are required to take the ETS Major Field Test for Business. The test will be administered within the BUS 410 class. There is a charge for the test.

## The Major in Accountancy

The University's accountancy program is designed to prepare students for careers in public accounting, industry, not-for-profit organizations and government. The program also provides students with sound preparation for successful graduate study in business, law and other areas. Courses represent rigorous examinations of accounting concepts, principles and applications which provide the foundation for successful professional accountancy careers. The University also offers a master of science in accountancy (M.S.A.) degree. The MSA program requires 36 semester hours and can be completed in one additional calendar year assuming full-time enrollment and that all prerequisite work has been completed.

## Requirements for Accountancy Major Bachelor of Science Degree

In addition to completing the University core curriculum and the business core curriculum, all accountancy majors must complete the following courses:

ACC 211	Intermediate Accounting I	(3 crs)
ACC 212	Intermediate Accounting II	(3 crs)
ACC 223	Accounting Information Systems	(3 crs)
ACC 305	Tax Accounting	(3 crs)
ACC 311	Managerial Cost Accounting	(3 crs)
ACC 401	Advanced Accounting Practice	(3 crs)
ACC 403	Accounting for Government and Not-for-Profit Organizations	(3 crs)
ACC 406	Auditing Theory and Practice	

Plus **one** of the following courses:

ACC 402	Controllership	(3 crs)
ACC 499	Law for Accountants	(3 crs)
ACC 415	Internship in Accounting	(3 crs)

## Business Department Minors

### The Minor in Business

Students majoring in disciplines other than business and accountancy may earn a minor in business by completing the following courses:

ACC 123	Principles of Accounting I	(3 crs)
MGT 111	Principles of Management	(3 crs)
ECO 221	Microeconomics	(3 crs)
MKT 211	Principles of Marketing	(3 crs)
FIN 211	Principles of Finance	(3 crs)

### The Minor in Accountancy

Students majoring in disciplines other than accountancy and business may earn a minor in accountancy by completing the following courses:

ACC 123	Principles of Accounting I	(3 crs)
ACC 124	Principles of Accounting II	(3 crs)
ACC 211	Intermediate Accounting I	(3 crs)
ACC 212	Intermediate Accounting II	(3 crs)
ACC 311	Managerial Cost Accounting	(3 crs)
ACC 305	Tax Accounting	(3 crs)

### The Minor in E-Commerce

This minor combines an overview course in “e-commerce” and a pertinent internship with courses in computer science, professional writing and business. The range of electives offered enables students to “design” the minor in accordance with their individual interests.

Required courses:

MGT 330	Introduction to E-Commerce	(3 crs)
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One of the following internships:

CSC 373	Computer Science	(2 or 3 crs)
PWR 473	Professional Communications	(2 or 3 crs)
BUS 474	Business	(2 or 3 crs)

Four of the following electives are also required:

MKT 316	Consumer Behavior	(3 crs)
MKT 323	Marketing and E-Commerce	(3 crs)
CSC 108	Intro. to Structural Programming	(3 crs)
CSC 220	Social, Professional and Ethical Issues in Computer Science	(3 crs)
CSC 3xx	Advanced Web Programming	(3 crs)
PWR 253	Web and Multimedia Authoring I	(3 crs)
PWR 254	Web and Multimedia Authoring II	(3 crs)
PWR 342	Media Ethics	(3 crs)

### Special Note for Minors

Individuals pursuing a minor must observe all prerequisites.



# Course Descriptions

## ACCOUNTING

### ACC 123 Principles of Accounting I (3 crs)

An introduction to basic financial accounting theory and practice.

### ACC 124 Principles of Accounting II (3 crs)

Continuing coverage of financial accounting and introduction of cost and managerial accounting. Prerequisite: ACC 123.

### ACC 211 Intermediate Accounting I (3 crs)

An extensive examination of descriptive financial accounting theory and practice. Constitutes the first accounting course at the professional level for the student majoring in accounting. Prerequisite: ACC 124.

### ACC 212 Intermediate Accounting II (3 crs)

Continues the extensive study of descriptive financial accounting theory and practice. Prerequisite: ACC 211.

### ACC 223 Accounting Information Systems (3 crs)

This course is a practicum in commercial accounting systems. Students will perform general ledger, accounts payable, accounts receivable, billing, purchase order, inventory, payroll and job costing functions using a commercial software package. The software will be used to design specialized reports for budgeting, financial analysis, product costing and for analyzing cost management techniques. Another package designed specifically for activity-based costing will be used to learn how this method of managing overhead can enhance a business's performance. Student learning will be developed and measured through computer intense projects, class discussion, library and field research. Systems theory and information technology topics are also discussed. Prerequisites: ACC 124.

### ACC 305 Tax Accounting (3 crs)

This course addresses taxation of individual income. Basic tax concepts are examined along with tax rules and regulations. Tax preparation and tax research software are used extensively. Students who have successfully completed the course often work in the Wheeling Jesuit Tax Clinic for hands-on experience.

### ACC 311 Managerial Cost Accounting (3 crs)

A critical analysis of cost concepts as they relate to the administrative process. Includes the presentation of case studies and the use of electronic spreadsheets. Prerequisite: ACC 124.

### ACC 401 Advanced Accounting Practice (3 crs)

An advanced study in the theory and related problems applicable to specialized topics in advanced financial accounting. Topics include: partnerships, business combinations, installment sales, consignments, foreign operations and estates and trusts. Prerequisite: ACC 213.

### ACC 402 Controllership (3 crs)

Investigates and studies the controller function within the contemporary organization. The controller is typically the chief accounting officer. The course studies the different functions for which the controller has traditionally been responsible as well as the changing role of the controller in the age of information technology.

### ACC 403 Accounting for Government and Not-for-Profit Organizations

Deals with financial accounting and reporting for federal, state and local governments and for medical, educational, religious, human services, charitable and other nonbusiness organizations. Topics include: fund accounting; financial reporting and budgetary control for not-for-profit organizations; program-planning-budgeting systems; and governmental and institutional auditing. Prerequisite: ACC 401.

### ACC 406 Auditing Theory and Practice (3 crs)

Examination of the philosophy, concepts and techniques pertaining to the auditing process. Prerequisite: ACC 212.

### BUS 221 Quantitative Business Analysis (4 crs)

This course addresses the vital tools of business management including statistical applications, sampling, data collecting, simple linear regression, ANOVA, Chi Square, simple linear programming, networks and decision analysis.

### BUS 313 Information Systems and Operations (3 crs)

This course addresses systems in an operations environment, including computer hardware, software, communications, data bases, data warehousing, data mining, enterprise systems, e-commerce, IS acquisition, product/service development, process analysis, forecasting, capacity and aggregate planning, scheduling, MRP, JIT, inventory management. Prerequisites: MGT 111, ACC 124, BUS 221.

### BUS 315 Business Law (3 crs)

Study of the bases of the law and the Uniform Commercial Code, which is most likely to be encountered in a business environment. Topics include contracts, personal property, bailments, sales, torts, government regulation, administrative agencies, corporations, partnerships, commercial paper, insurance, bankruptcy, real property, estates and trusts.

### BUS 410 Strategic Business Planning (3 crs)

This capstone course is concerned with the development of approaches for defining, analyzing and resolving complex strategic problems of profit and not-for-profit organizations. The course should be taken in the last year of the student's program.

### BUS 100, 200, 300, 400 Business Skills (1 cr/year)

This seminar course addresses a wide variety of activities aimed at enhancing students' business skills, including social skills, communication, computer, writing and speaking skills. Methodology will include business simulations, guest speakers, alumni contacts, research, field trips, sporting activities and networking.

### BUS 489 Global Economic Development (3 crs)

This course will focus on the challenges of worldwide economic development and the political and economic factors necessary to improve the lives of people in under-developed countries and regions. The roles of developed countries and of multinational organizations will be explored together, with the responsibilities of under-developed countries themselves. Current strategies, both in place and proposed, will be examined from a real, applied perspective.

## ECONOMICS

### ECO 110 Principles of Macroeconomics (3 crs)

A presentation of basic macroeconomic relationships. Topics emphasized are: the determination of income and employment, monetary and fiscal policies, inflation, interest rates and economic growth.

**ECO 221 Principles of Microeconomics (3 crs)**

A presentation of basic theories of consumer behavior and of the firm. Other topics include: study of elasticity, firm and industry equilibrium under various market structures and international trade. Prerequisite: ECO 110.

**ECO 312 Intermediate Microeconomics (3 crs)**

An examination of the economic theory of households, the theory of the firm, price determination and resource allocation. Prerequisites: ECO 121, MGT 121 or MAT 106.

**ECO 321 History of Economic Thought (3 crs)**

Economic ideas in perspective of historic development. Prerequisite: ECO 221.

**ECO 324 Contemporary Economic Issues (3 crs)**

The relationship of economic theory and the real world. An examination of current socioeconomic problems, issues and alternative solutions. Topics include: unemployment, inflation, productivity, government regulations, national debt, health care, pollution and the use of natural resources. Prerequisite: ECO 221.

**FINANCE****FIN 211 Principles of Finance (3 crs)**

A basic study of organizational and financial practices and problems which arise in connection with business organizations, especially the corporation. Topics include: the time value of money, basic capital budgeting, basic long-term financing decisions and working capital policy. Prerequisites: ECO 121, ACC 124.

**FIN 316 Principles of Investments (3 crs)**

Concerned with the process of investment in marketable securities. Topics covered include: security types and markets, basic market concepts, efficient capital markets, security analysis and investment strategies. Prerequisite: FIN 211.

**FIN 326 Money and Banking (3 crs)**

A study of the monetary relationships between commercial banks, the Federal Reserve System and public policy. Assesses the impact of these relationships on the economy of the nation. Prerequisites: FIN 211 and ECO 110.

**FIN 318 International Finance (3 crs)**

This course is designed to extend to the student's knowledge of corporate finance, investment and financial institutions to the international arena. Examines the environment for international finance and banking, regulatory complexities, balance of payments and foreign exchange. Emphasizes the unique aspects of international financial management as related to cash management, capital budgeting and cost of capital. Prerequisites: ACC 123, ACC 124, ECO 110, ECO 221, FIN 211 and FIN 215.

**INTERNATIONAL BUSINESS****INB 324 International Business Law (3 crs)**

The course studies development of a body of law governing commercial relations between states; how such law is formed; means by which this law can be enforced; case studies illustrating major principles.

**INB 473 Domestic Internship in a Multinational Firm (3 crs) (International students only)**

A structured program of work experience. Places non-U.S. students in business organizations that provide opportunities for involvement in international business-related activities. Successful participation in this program is accepted in lieu of Field Experience as a capstone activity. Placement is subject to availability. Prerequisite: Senior Rank

**INB 474 Field Experience in a Firm Abroad (3 crs)**

A practical exercise focusing on gaining understanding of the global business environment. Composed of two components beginning with an academic study of a specific foreign business environment that is followed by an organized visit and introduction to the foreign business community. Emphasis is given to cultural impact on life style and the conduct of business ranging from social etiquette to the legal framework. Prerequisite: Senior Rank

**MANAGEMENT****MGT 111 Principles of Management (3 crs)**

Management is the process of working with and through people to obtain organizational objectives. The introductory level survey course examines the management functions of organization, controlling, leading and motivating. General Systems Theory will be emphasized as an analytical tool. Supervisor behavior and skills will be key topics.

**MGT 122 Business Calculus (3 crs)**

A survey of the basic techniques of differential and integral calculus including polynomial, logarithmic and exponential functions. Applications to finance and economics. Does not satisfy the core requirement in mathematics.

**MGT 226 (PSY 226) Organizational Behavior (3 crs)**

A survey course that examines individual and group behavior in an organizational context. The underlying thesis of this course is that an increased understanding of the human system can result in an organization that is more effective at meeting both the organization's objectives and the goals and needs of the individual employees. Major topics include: motivation, leadership, group processes and attitudes. (replaces MGT 216)

**MGT 311 International Business (3 crs)**

This course treats various aspects of international business, with particular emphasis on the role of the multinational company, whether headquartered in the United States or in another country. After considering the international financial and trade frameworks, the student explores the functional areas of the multinational company: finance, production, marketing and personnel. Examined will be the various economic, political and social forces that shape corporate strategies and objectives in the international marketplace. Prerequisites: ACC 123 and ECO 110 or permission from instructor.

**MGT 312 (PSY 312) Industrial Psychology (3 crs)**

A survey of the field of industrial/organizational psychology with particular emphasis on the classical industrial psychology domain of selection. The course, as in the case with the field of industrial/organizational psychology, is somewhat quantitative. Prerequisite: MAT 105.

**MGT 315 Conceptual Foundations of Business (3 crs)**

This course embraces the major ideas and institutions that make up an important part of the environment within which business transactions take place. The ideas are those philosophical concepts which have helped to shape business and society. The institutions include not only business institutions but also those legal and political institutions which have a major bearing on business.

**MGT 316 Business and Society (3 crs)**

This course provides students with a systematic treatment of the role of business in American society. Areas covered will include the historical evolution of business and government relationship, the managerial role in formulating policies and practices having social consequences, the role of corporate social audits, the quality of work life, corporate ethics and selected current issues.

**MGT 320 Small Business Management and Entrepreneurship (3 crs)**

A study of all the specifics involved in investigating, planning, organizing and operating a new business venture.

**MGT 330 Introduction to Electronic Commerce (3 crs)**

The purpose of this course is to give the student a basic understanding of the use of electronic commerce, its structure and the technologies involved. The course encompasses retail, business to business and governmental sectors. Students will be given an overview of the structure of the electronic commerce, its uses and technological components.

**MGT 331 Organizational Communications (3 crs)**

Successful communication is frequently a causal factor in organizational effectiveness. This case-oriented course examines the fragile nature of the communication process. Specific errors are identified and corrections are suggested.

**MGT 340 Organizational Leadership (3 crs)**

After examining the evolution of leadership theory, this course focuses on a contemporary leadership model. The student's leadership style will be determined and personal development opportunities will be provided. Prerequisite: MGT 226.

**MGT 426 Human Resource Management (3 crs)**

This course examines the functions performed by human resource professionals in the dynamic environment of the 21st century. Major topics include human resource planning, job analysis, recruitment, selection, compensation, benefit administration, performance evaluation and training. Special emphasis will be given to the ethical considerations and legal issues impacting on employment decisions. Prerequisite: MGT 111.

**MARKETING****MKT 211 Principles of Marketing (3 crs)**

An examination of the fundamental concepts of marketing activities. Takes a managerial perspective to introduce product, price, place and promotion elements of the marketing mix. Prerequisite: Sophomore Standing.

**MKT 310 Marketing Research (3 crs)**

The methods and techniques of securing, analyzing and interpreting data for effective managerial decision-making will be explored. Focuses on the conceptual design of marketing research studies and the interpretation of data. Prerequisites: MKT 211, MAT 105, BUS 221.

**MKT 313 Advertising Management (3 crs)**

A study of the managerial and creative aspects of advertising including media planning, development of the creative platform, advertising research and communication effects. Prerequisite: MKT 211.

**MKT 315 International Marketing (3 crs)**

Introduces the formation of marketing strategy within the context of international business. Includes the study of international institutions and agreements that affect worldwide economic activity and an analysis of the economic, cultural, political and legal environments of international marketing. Special attention is given to the area of export management. Prerequisite: MKT 211.

**MKT 316 Consumer Behavior (3 crs)**

Designed to integrate theories of consumer behavior that impact upon an organization's marketing activities. Explores individual and group behavior factors. Prerequisites: PSY 110, MKT 211.

**MKT 317 Services Marketing (3 crs)**

Over half of the GNP in the U.S. comes from service related businesses. Nonprofit organizations (schools, hospitals, churches, etc.) view marketing as an increasingly important function. This course applies marketing principles and techniques to the unique needs of these organizations. Prerequisite: MKT 211.

**MKT 323 Marketing and Electronic Commerce (3 crs)**

In this course, students will learn the application of marketing mix (i.e. product, price, distribution and promotion) decisions to electronic commerce. Students will also gain an insight in consumer behavior regarding the use of electronic commerce in purchase decisions. Prerequisite: MKT 211.

**MKT 420 Marketing Strategies (3 crs)**

The study of essential aspects of effective marketing strategy formulation and implementation. An appreciation of the complexity of managerial decision-making will be stressed. Emphasis will be on case studies to more fully demonstrate segmentation, targeting, positioning and other marketing mix strategies. Prerequisite: MKT 211.

# Catholic Studies

Contact Person: Robert J. Phillips, Ph.D.

The goal of this program is to deepen the awareness and understanding of Catholic Intellectual Tradition. Catholic Studies includes the contributions of Catholic reflection and practice, but extends beyond theology, church history, morality and liturgy. In particular, students will investigate the Catholic Intellectual Tradition from the distinct perspectives of art and music, literature, politics and social justice.

## Requirements for Catholic Studies Minor

A Catholic Studies minor must complete the following courses:

CST 201	The Catholic Vision	(3 crs)
CST 301	Classics of the Catholic Intellectual Tradition	(3 crs)
		<hr/>
		(6 crs)

The minor is completed by taking one course in each of the following areas:

Humanities	(3 crs)
Social Science	(3 crs)
Theology or Philosophy	(3 crs)
Elective	(3 crs)
	<hr/>
	(12 crs)

Note: While students will be encouraged to take RST 107 (Catholicism), it is not required for the minor

## Special Note on Catholic Studies Minor

The minor in Catholic Studies requires 18 hours and is earned by completing a six-credit core and 12 hours of elective credit that reflects the interdisciplinary nature of the Catholic Intellectual Tradition.

# Course Descriptions

### CST 201 The Catholic Vision (3 crs)

This course serves as an orientation to the minor. The course identifies what is distinctive about the Catholic vision and so will examine such fundamental issues as: the principle of sacramentality, the relationship of the person to the common good, the centrality of morality, the relationship of faith and reason, as well as a philosophy of the human person before God. This course is comprised of material drawn from the humanities, the natural and social sciences and theology.

### CST 301 Classics of the Catholic Intellectual Tradition I (3 crs)

This course is a seminar that examines a seminal thinker and/or classic works in the Catholic Intellectual Tradition.

# Chemistry

Contact Person: Michael J. Baird, Ph.D.

Chemistry is the central science linking mathematics and physics to the biological sciences. The creative insight of chemists into the substance of nature has led not only to an elegant model of the material world, but also to a valuable utility in everyday life. Our goal is to introduce students to the principles of chemistry and the processes of thought which have organized these principles into a coherent body of knowledge.

The chemistry program at Wheeling Jesuit University offers two degree paths — the bachelor of science degree (BS) and the bachelor of arts degree (BA). The BS degree is designed to prepare students for careers in chemistry. The program consists of 50-52 hours of chemistry and prepares students for graduate school or entry-level positions in the industry. The BA degree, with 30-31 hours of chemistry, is more flexible. It is designed to prepare students for careers in medicine, dentistry, physical therapy, pharmacy, forensics, environmental science and chemical education.

## Requirements for Chemistry Major Bachelor of Science Degree

Upon completion of the Chemistry program, students will be able to demonstrate the ability to:

1. Understand the principles and concepts fundamental to chemistry.
2. Apply lab techniques appropriate for an entry-level chemist.
3. Have problem-solving skills.
4. Be proficient in oral and written communication.

In addition to completing the core curriculum requirements, outlined on pp. 14-15 of this catalog, chemistry majors must complete the following courses:

CHE 110, 120	General Chemistry Lecture I, II	(8 crs)
CHE 121, 122	General Chemistry Lab I, II	(2 crs)
CHE 221, 222	Organic Chemistry Lecture I, II	(8 crs)
CHE 231, 232	Organic Chemistry Lab I, II	(2 crs)
CHE 315	Quantitative Analysis	(3 crs)
CHE 319	Quantitative Analysis Lab	(1 cr)
CHE 316	Instrumental Analysis Lecture	(3 crs)
CHE 317	Instrumental Analysis Lab	(1 cr)
CHE 321, 322	Physical Chemistry Lecture I, II	(8 crs)
CHE 331, 332	Physical Chemistry Lab I, II	(2 crs)
CHE 314	Biochemistry	(3 crs)
CHE 401	Inorganic Chemistry	(3 crs)
CHE 480	Seminar	(1 cr)

Chemistry Option (one of the following):

CHE 318	Environmental Chemistry	(3 crs)
CHE 405	Advanced Inorganic Chemistry	(3 crs)
CHE 410	Advanced Biochemistry	(3 crs)
CHE 415	Advanced Organic Chemistry	(3 crs)
CHE 420	Advanced Physical Chemistry	(3 crs)

Required Lab or Project (one of the following):

CHE 344, 345	Biochemical Lab Projects I, II	(2 crs)
CHE 431, 432	Advanced Laboratory Techniques I, II	(4 crs)
CHE 477, 478	Senior Research Project I, II	(4 crs)

Other required courses:

MAT 111, 112	Calculus I, II	(8 crs)
PHY 110, 120	Physics Lecture I, II	(8 crs)
PHY 121, 122	Physics Lab I, II	(2 crs)
		<u>(68-70 crs)</u>

Note: The program outlined above meets or slightly exceeds the requirements for certification by the American Chemical Society.

### Requirements for Bachelor of Arts Degree in Chemistry

Upon completion of the BA degree program, students will be able to demonstrate the ability to:

1. Understand the principles and concepts fundamental to science, with an emphasis in chemistry.
2. Possess laboratory experiences appropriate for a person knowledgeable in science.
3. Have problem-solving skills.
4. Be proficient in oral and written communication.

The BA chemistry major is designed to be combined with a minor or a program rather than as a stand-alone program. The flexible nature of this program allows students to take courses in biology, education, computer science, math, business, etc. to prepare them for medical, dental, pharmacy and physical therapy schools. It is also a desired degree for those entering professions in forensics, environmental science and chemical education.

In addition to completing the core curriculum requirements outlined on pp. 14-15 of this catalog, BA chemistry majors must complete the following courses:

CHE 110, 120	General Chemistry I and II	(8 crs)
CHE 121,122	General Chemistry Lab	(2 crs)
CHE 221, 222	Organic Chemistry I and II	(8 crs)
CHE 231, 232	Organic Chemistry Lab I and II	(2 crs)
CHE 315	Quantative Analysis	(3 crs)
CHE 319	Quantitative Analysis Lab	(1 cr)
CHE 321	Physical Chemistry I	(4 crs)
CHE	Approved 300-Level Electives	(2-3 crs)
MAT 111, 112	Calculus I and II	(8 crs)
PHY 110, 120	Physics I and II	(8 crs)
PHY 121, 122	Physics Lab I and II	(2 crs)
		<u>(48-49 crs)</u>

### Requirements for a Minor in Chemistry

A minor in chemistry is recommended for students majoring in biology, physics, computer science, management, marketing, pre-engineering, pre-legal studies or professional writing.

The following chemistry courses must be completed: CHE 110, CHE 120, CHE 121, CHE 122, CHE 221, CHE 222, CHE 231, CHE 232 and either CHE 315 and CHE 319 or CHE 314 and CHE 344.

### Core Fulfilling Courses

CHE 105	Intro. General, Organic and Biochemistry	(3 crs)
CHE 107	Intro. Chemistry for Non-science majors	(3 crs)
CHE 110	General Chemistry Lecture	(4 crs)

### BS in CHEMISTRY - Recommended Course Sequence

	Freshman		Sophomore		Junior		Senior	
<b>FALL</b>	FYS 101	1	CHE 221	4	CHE 315	3	CHE 401	3
	CHE 110	4	CHE 231	1	CHE 319	1	RST Elective	3
	CHE 121	1	PHY 110	4	CHE 321	4	SSC Core	3
	MAT 111	4	PHY 121	1	CHE 331	1	CHE 480	1
	ENG 105 or 110	3	MOL	3	LIT 250	3	FAS 20x	2
	HIS 110	3	Elective	3	PHI 105	3	CHE 314	3
					FAS 101	1	Lab or Project	1-2
Semester total	16		16		16		16-17	
<b>SPRING</b>	CHE 120	4	CHE 222	4	CHE 316	3	RST/PHI 305	3
	CHE 122	1	CHE 232	1	CHE 317	1	Global Persp.	3
	MAT 112	4	PHY 120	4	CHE 322	4	Electives	6
	LIT 120	3	PHY 122	1	CHE 332	1	Chem. Option	3
	HIS 120	3	MOL	3	PHI 205	3	Lab or Project	1-2
			Elective	3	RST 106/107	3		
	Semester total	15		16		15		16-17
Total Credits	31		32		31		32-34126-128	

# Course Descriptions

## CHE 105 Intro. General, Organic & Biochemistry (3 crs)

A one-semester introduction to fundamental chemical principles necessary to describe the behavior of matter. Biochemical concepts and medical applications included as needed. Required for BSN majors.

## CHE 107 Intro. Chemistry for Non-science Majors (3 crs)

Introductory chemistry course for the non-science major emphasizing applications of chemistry to problems involving environmental pollution, sources of energy, radioactivity and human health.

## CHE 110, 120 General Chemistry (4 crs ea)

Modern concepts of atomic structure and chemical properties, chemical bonding, stoichiometry, chemical equilibrium and kinetics. For CHE 120, CHE 110 is a prerequisite.

## CHE 121, 122 General Chemistry Lab (1 cr ea)

Qualitative and quantitative studies of chemical systems. Introduction to basic synthetic and instrumental chemical methods. For CHE 122, CHE 120 is a corequisite.

## CHE 221, 222 Organic Chemistry Lecture (4 crs ea)

The study of the structure and reactions of organic compounds as described by modern theories of bonding and reactivity. Prerequisite: CHE 110 and 120 or equivalent.

## CHE 231, 232 Organic Chemistry Lab (1 cr ea)

The techniques necessary to synthesize and identify organic compounds by both chemical and instrumental methods. Prerequisite: CHE 122 or equivalent. For CHE 231, CHE 221 is a corequisite. For CHE 232, CHE 222 is a corequisite.

## CHE 312 Introductory Physical Chemistry (3 crs)

A basic course which develops the principles of thermodynamics, equilibrium and kinetics. Prerequisites: CHE 120 and 222, MAT 112, PHY 120.

## CHE 314 Biochemistry (3 crs)

A basic course which develops concepts necessary for a description of macromolecular structure, biological regulatory processes and chemical biodynamics. Prerequisite: CHE 222.

## CHE 315 Quantitative Analysis (3 crs)

Principles of quantitative analysis with a general introduction to instrumental methods. Emphasis on development of analytic skills as currently employed. Prerequisite: CHE 120 and 122 (BIO 315 is strongly recommended).

## CHE 316 Instrumental Analysis (3 crs)

A lecture course in the theory and application of modern instrumental methods of separation and analysis. Prerequisites: CHE 315, PHY 120, PHY 122.

## CHE 317 Instrumental Analysis Lab (1 cr)

A laboratory course in the theory and application of modern instrumental methods of separation and analysis. Corequisite: CHE 316.

### BA in CHEMISTRY - Recommended Course Sequence

	Freshman		Sophomore		Junior		Senior	
FALL	FYS 101	1	CHE 221	4	CHE 315	3	PHI 105	3
	CHE 110	4	CHE 231	1	CHE 319	1	RST Elective	3
	CHE 121	1	PHY 110	4	CHE 321	4	Elective	3
	Elective	3	PHY 121	1	Electives	4	FAS	2
	ENG 105 or 110	3	SSC Core	3	MOL	3	PHI 205	3
	HIS 110	3	MAT 111	4	RST 106/107	3		
Semester total	15		17		18		14	
SPRING	CHE 120	4	CHE 222	4	CHE Elective	2-3	PHI 205	3
	CHE 122	1	CHE 232	1	Electives	4	PHI/RST 305	3
	Elective	3	PHY 120	4	MOL	3	Electives	9
	LIT 120	3	PHY 122	1	LIT 250	3		
	HIS 120	3	Global Persp.	3	FAS 101	1		
			MAT 112	4				
Semester total	14		17		13-14		15	
Total Credits	29		34		31-32		29 123-125	

**CHE 318 Environmental Chemistry (3 cr)**

Basic chemistry of soils, atmosphere and natural waters. Changes resulting from pollution discharges. Chemical perspectives on environmental problems. Prerequisite: CHE 120 and 122.

**CHE 319 Quantitative Analysis Lab (1 cr)**

A laboratory course involving the principles of quantitative analysis and an introduction to instrumental methods. Prerequisites: CHE 120 and 122. Corequisite: CHE 315.

**CHE 321, 322 Physical Chemistry Lecture (4 crs ea)**

Modern concepts of molecular structure, chemical thermodynamics, equilibrium and kinetics. Prerequisites: CHE 120 and 222, MAT 112, PHY 120.

**CHE 331, 332 Physical-Instrumental Measurements Lab (1 cr ea)**

Experiments in physical-chemical measurements with an emphasis on instrumental methods. Prerequisites: CHE 122, CHE 232, PHY 122.

**CHE 344, 345 Biochemical Lab Projects I & II (1 cr ea)**

Directed experiments to illustrate basic testing procedures performed in hospitals and research biochemistry laboratories. Experimental test results related to actual patient case histories will provide for meaningful discussions about medical biochemistry in health and disease. Pre/Corequisite for I is CHE/BIO 314; Prerequisite for II is CHE 344.

**CHE 401 Inorganic Chemistry (3 crs)**

Modern concepts of bonding and structure in inorganic compounds, reactivity and reaction mechanisms, acid-base and solid state chemistry. Prerequisite: CHE 322.

**CHE 405 Advanced Inorganic Chemistry (3 crs)**

An advanced topics lecture course in inorganic chemistry. Prerequisites: CHE 322 and 401.

**CHE 410 Advanced Biochemistry (3 crs)**

An advanced topics lecture course in physical biochemistry. Prerequisite: CHE 314 and 322.

**CHE 415 Advanced Organic Chemistry (3 crs)**

An advanced topics lecture course in physical-organic chemistry. Prerequisites: CHE 222 and 322.

**CHE 420 Advanced Physical Chemistry (3 crs)**

An advanced topics lecture course in physical chemistry. Prerequisite: CHE 322.

**CHE 431, 432 Advanced Lab Techniques I & II (1 or 2 crs ea)**

Directed experimental projects in the synthesis of organic and inorganic compounds. Emphasis on instrumental characterization. Prerequisite: CHE 332.

**CHE 477, 478 Senior Research Project I and II (2 crs ea)**

Directed research projects. A seminar and the satisfactory completion of an original paper are integral parts of each course. Prerequisite: Senior standing as a major.

**CHE 450 Thesis**

Completion of senior research project resulting in an undergraduate research thesis. Prerequisites: Senior standing, permission.

**CHE 480 Seminar (1 cr)**

Seminar presentations by faculty and chemists from industry and other academic institutions; student presentations on their undergraduate research and literature topics. Prerequisite: Senior standing as major or permission.

**NOTE: Without passing grades in prerequisites, 400-level chemistry courses may be taken only on a credit/no-credit basis.**

# Clinical Science

## Course Descriptions

**CLS 121 Introduction to Hospital Science (2 crs)**

The duties and responsibilities of various health care professions; introduction to medical terminology; seminars, speakers and field trips. For 3 hours credit, an introduction to the use of computers in the hospital, college and personal settings is added.

**CLS 130 (PHY 130) Physics for Allied Health (3 crs)**

General physical principles with special emphasis on gas laws, flow principles, fluidics, the use of formulae and how they apply to nuclear medicine technology and respiratory therapy.

**CLS 215 Introduction to Epidemiology (2 crs)**

The recognition of normal flora occurring on/within the human body, invasion processes, control mechanisms for the prevention of the spread of microorganisms and the effects of the infection by certain specific microbes will be covered. Principles of immunology are covered as well.

**CLS 234 (BIO 234) Pathophysiology (3 crs)**

A survey of disease processes which affect tissues, organs, or the body as a whole. Prerequisites: BIO 128 and BIO 129, or equivalent. A system-wide approach with interactions.

**CLS 311 Introduction to Pharmacology (1 cr)**

Principles of drug actions and reactions.

**CLS 312 Emergency Life Support Techniques (3 crs)**

Emergency procedures for first responders. Includes cardiopulmonary resuscitation.

**CLS 320 Management Techniques for the Health Sciences (2 crs)**

An introduction to the principles, practices and problems of management encountered in the allied health professions.

**CLS 330 Principles of Instruction (2 crs)**

An introduction of educational methods, techniques and their application to a clinical setting, academic classroom or professional arena. This class offers a systematic approach to instruction, presentation, teaching and methods of practice as it relates to educational instruction or professional seminars. This course also includes a service learning project.

# Computer Science

Contact Persons: *Margaret Geroch*

*Beverly Carter, Ph.D.*

*Patrick Plunkett (Chair)*

The computer science major is designed to provide a wide acquaintance with various aspects of computing, ranging from the theoretical to the practical, with an emphasis on the solution of actual problems. Currently the C++ programming language is emphasized in the introductory sequence of courses. There is a strong mathematics component since we believe that the successful computer scientist, whether seeking a job or continuing his/her education, is best served by understanding the necessary mathematical thinking and processes that underlie all of computer science.

Upon completion of the Computer Science program, students will be able to demonstrate the ability to:

1. Frame and resolve ill-defined problems.
2. Write small-to-medium-scale programs using software engineering techniques and top-down structured programming.
3. Develop software in a team environment.
4. Integrate knowledge from other disciplines into solutions to real-world problems using various computer languages.
5. Recognize limitations and discover solutions to leading-edge technological issues.

## Requirements for Computer Science Major Bachelor of Science Degree

In addition to completing the core curriculum requirements (17 courses listed on p. 14-15 of this catalog, at least 1 of which is also included below) all majors in computer science must complete at least the following courses:

CSC 110	Computer Science I	(3 crs+1 cr lab)
CSC 112	Computer Science II	(3 crs+1 cr lab)
CSC 222	Computer Science III	(3 crs)
CSC 220	Social, Professional and Ethical Issues in Computer Science	(3 crs)
CSC 310	Analysis of Algorithms	(3 crs)
CSC 320	Programming Languages	(3 crs)
CSC 325	Operating Systems	(3 crs)
CSC 330	Database Management	(3 crs)
CSC 335	Software Engineering	(4 crs)
CSC 350	Computer Architecture	(3 crs)
CSC 482	Senior Seminar	(1 cr)
MAT 111	Calculus I	(4 crs)
MAT 235	Discrete Mathematics	(4 crs)
MAT 105, 106	Introduction to Statistics I and II	(6-7 crs)
	or	
MAT 112, 335	Calculus II and Applied Probability and Statistics	
CSC Electives	(At least 5 upper level courses)	(15 crs)
		<u>(63-64 crs)</u>

### COMPUTER SCIENCE - Typical Course Sequence

	Freshman		Sophomore		Junior		Senior	
<b>FALL</b>	FYS 101	1	MAT 235	4	MAT 335 or 106	3	CSC 482	1
	MAT 111	4	CSC 222	3	CSC 320	3	CSC 335	4
	CSC 110	4	PHI 105	3	CSC Elective	3	CSC Elective	3
	HIS 110	3	RST 106/107	3	RST Elective	3	CSC 350	3
	MOL	3	LIT 120	3	CSC Elective	3	Elective	3
	Semester total	15		16		15		14
<b>SPRING</b>	CSC 112	4	CSC 220	3	CSC Elective	3	CSC 325	3
	HIS 120	3	MAT 112 or 105	4	CSC 330	3	CSC Elective	3
	MOL	3	LIT 250	3	PHI/RST 305	3	Science	3
	ENG 105 or 110	3	PHI 205	3	Global Persp.	3	CSC Elective	3
	SSC Core	3	CSC 310	3	FAS 101	1	FAS 20x	2
					Science	3		
Semester total	16		16		16		14	
Total Credits	31		32		31		28	122

### Special Note on Elective:

Of the five or more CSC electives, at least three must be chosen from the current CSC elective list. Such courses may include CSC 340 (Graphics), CSC 315 (Advanced Web Programming), CSC 420 (Systems Administration) and CSC 415 (Artificial Intelligence). The remaining electives may also be CSC elective courses, or chosen from a list including MAT 240 (Linear Alg), MAT 331 (Numerical Analysis), MAT 212 (Differential Equations), PHY 260 (Computer Hardware), PWR 253/254 (Web/Multimedia Authoring I/II) or other approved courses. The elective sequence must be approved by the department chair, and all prerequisites for courses selected must be met. At most, one internship or independent study can be counted among the five electives.

A capable student should take more than the minimum number of five Computer Science Electives, especially if graduate school is planned. A well-prepared and industrious student who takes occasional overloads and/or summer school courses has room to declare a minor as well as a major. Popular minors for Computer Science majors include Mathematics, Physics, Business and E-Commerce.

Since the computer science major includes a strong mathematics component, we assume that the entering freshman has a good mathematics background, including advanced algebra, trigonometry and pre-calculus, and can begin Calculus I as a freshman. We also assume that the student beginning a computer science major has had previous programming experience using some high-level programming language such as BASIC or PASCAL. In both cases, courses covering this material are available (MAT 090, MAT 091, MAT 092, MAT 108 and CSC 108), but having to take these courses first will slow down a student's progress in the major sequence.

### Requirements for a Minor in Computer Science

For a minor in computer science, the following are required: CSC 110, CSC 112, CSC 220, CSC 222 and at least three other CSC courses at the 200 level or above.

Any computer science course may be taken by a non-math or non-computer science major provided the necessary prerequisites are met. Some courses which may be attractive include: CSC 108, 110, 112, 220, and the occasional upper level course intended for a wider audience.

### Minor in Electronic Commerce

Computer science students are encouraged to investigate the e-commerce minor listed on page 36.

# Course Descriptions

In general (unless otherwise noted), 100-level courses are offered both semesters every year, 200-level courses are offered once every year, 300-level required courses are offered at least once every other year, and electives are offered approximately every two years as faculty and resources permit.

### CSC 108 Introduction to Structured Programming (3 crs)

An introduction to computer-oriented problem solving using a structured programming language. Covers file management and effective use of an operating system as well as introductory programming techniques and documentation. No previous computer experience or programming expertise is assumed. Not counted among the requirements for Computer Science Major. (MAT 091-092 or MAT 090 required for those with insufficient mathematics background.)

### CSC 110 Computer Science I (4 crs)

An introduction to the general fields of study of Computer Science, including a discussion of different programming languages, their styles and strengths. This course emphasizes the methodology of structured programming in a high level language (currently C++), introduces basic data structures and elementary algorithms. An emphasis is placed on reusable software tools, good documentation and top-down design. Programming and other written assignments are included, and a separate supervised lab explores specific programming problems in more detail. The course requires previous programming experience in some high level programming language (such as CSC 108), and a strong mathematics background (determined by math placement). Prerequisites: CSC 108 or instructor approval. Required for Computer Science Major.

### CSC 112 Computer Science II (4 crs)

This course extends the acquaintance with the general fields of study of Computer Science, visiting them in more detail, and placing an emphasis on data structures, information storage and retrieval and numerical computation. This course uses objects and object oriented programming. Other data structures such as stacks, queues and linked lists are fully treated. Along with programming and written assignments, a separate supervised lab session explores more programming and operating system problems. Prerequisite: CSC 110. Required for Computer Science Major.

### CSC 222 Computer Science III (3 crs)

This course continues the exploration of the general fields of study of Computer Science, introducing more complex data structures, and placing a special emphasis on algorithm design and analysis. This course is currently taught with C++. Programming and written problems are assigned. Prerequisite: CSC 112. Required for Computer Science Major.

**CSC 220 Social, Professional and Ethical Issues in Computer Science (3 crs)**

This course deals with the impact of rapidly expanding computer technology on society, including many ethical and professional issues which have arisen. Professional activities, organizations and publications are also explored. Although the course does not include programming assignments, the student must have experience in both programming and using computers for a variety of purposes. No specific prerequisites. Required for Computer Science Major.

**CSC 310 Analysis of Algorithms (3 crs)**

This course covers algorithm analysis theory and techniques. Students learn properties of both efficient and inefficient algorithms. The importance of analyzing algorithms before implementing them will be emphasized. This course will teach the skills necessary to determine the best algorithm for a given problem. Some types of algorithms investigated are: greedy, graph theoretic and divide and conquer. Both polynomial time algorithms and NP-completeness algorithms will be covered. Required for Computer Science major. Prerequisites: CSC 222 and MAT 235.

**CSC 315 Advanced Web Programming (3 crs)**

This course will advance the student in the field of programming for web-based applications. This programming will include advanced HTML, JavaScript, VBScript, CGI and Active Server Pages (ASP). Primary emphasis is in the use of ASP to design and create database-driven web applications. Prerequisites: CSC 108 and PWR 253 (or instructor permission). This course is an elective for Computer Science and part of the E-Commerce minor.

**CSC 320 Introduction to Programming Languages (3 crs)**

Language definition, structure, syntax and grammar, issues of data types, static and dynamic data storage management, control structures, subroutines and procedures, parameter passing styles, list processing techniques are covered. Imperative, declarative and functional languages are compared, with a variety of languages used as examples. Prerequisite: CSC 222. Required for Computer Science Major.

**CSC 325 Operating Systems (3 crs)**

A study of the programs which control a computer. Topics include computer structure, organization of storage and process, multi-programming and multi-processing, concurrent processes, scheduling and placement algorithms, memory management and virtual memory, elementary queuing theory and security. A number of different operating systems are employed. Prerequisite: CSC 222. Required for Computer Science Major.

**CSC 330 Database Design and Management (3 crs)**

Logical and physical database design concepts, database administration, with an emphasis on the relational model. A team or individual project requires the design and implementation of a relational database. Prerequisite: CSC 222. Required for Computer Science Major.

**CSC 335 Software Engineering (4 crs)**

Large program specification, design, modularization, documentation, validation, performance analysis and measurement, maintenance and user interface are covered. A programming project using a language such as Ada or C++ is completed. Prerequisite: CSC 222. Required for Computer Science Major.

**CSC 340 Introduction to Computer Graphics (3 crs)**

Introduction to the techniques used in designing and implementing two and three-dimensional graphics displays, using a high-level programming language as a foundation. Pre-requisite: CSC 222, MAT 235, MAT 111. (MAT 240 is also helpful). Elective for Computer Science Major.

**CSC 350 Computer Architecture (3 crs)**

This course introduces the student to the basics of computer hardware and organization, providing a firm foundation in general computer design issues. Topics covered include Boolean logic, gates, digital logic circuits, memory, CPU chips and buses, microarchitecture and microinstructions and parallel architectures. Prerequisites: CSC 222. Required for Computer Science Majors.

**CSC 373 Internship (3 crs)**

Students gain practical experience in the operation and administration of a computer center, system or network by working on systems projects in the Academic Computer Center, or with a private company. Prerequisite: CSC 325, Junior level status as a Computer Science Major, recommendation of the department chair.

**CSC 415 Artificial Intelligence (3 crs)**

This course includes an introduction to the methods and languages of artificial intelligence programming, including problem definition, a variety of solution methods and algorithms, knowledge representation, logical reasoning and a brief look at the techniques of expert systems, neural networks and genetic algorithms. Prerequisites: CSC 222, MAT 235. Elective for Computer Science Major.

**CSC 420 Systems Administration (3 crs)**

This course will acquaint the student with the setting up, managing and upgrading of a networked server platform. Issues covered include: networking fundamentals, installing network software, managing user accounts, configuring network software, security issues, installing and configuring network hardware and a variety of other topics. Prerequisite: CSC 222. This course is an elective for Computer Science, but encouraged for the E-Commerce minor.

**CSC 482 Senior Seminar (1 cr)**

This course includes group study of a topic chosen by the seminar leader, individual presentations and career planning information sessions. Prerequisites: CSC 222 and Senior level status. At least 2 of the 5 required 300 level CSC courses must be completed before this course can be taken. Required for Computer Science Major.

**X61 Special Topics (1-3 crs)**

According to current interests of faculty and students, topic courses are offered frequently as computer science electives. Recent offerings have included User Interface Design, Networks, Formal Language Theory, Compiler Design and Computer Haptics.