

Black Studies

Contact Information

Phone: 401.865.2083

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Location: Howley Hall 314

The Faculty

Professors

Anthony D. Affigne, Ph.D. (Political Science)

Eric L. Hirsch, Ph.D. (Sociology)

Assistant Professors

Matthew J. Dowling, Ph.D. (History)

Julia S. Jordan-Zachery, Ph.D. (Political Science), *Director*

The Program

The minor in black studies is intended to supplement the student's academic major with a scholarly understanding of African and African-American history, social and political life, culture and the arts, African heritage, and religious practice.

The Black Studies Program seeks to provide students with clear, precise, reliable, and accurate knowledge about the African-American community within the framework of a liberal arts education at a religious institution of higher learning.

The program fosters a strong grounding in the African-American community's contemporary state, history and traditions, unique culture, collective experience, and antecedent connection with Africa and African history.

To that end, teaching, analysis, and research within the program are directed toward the community's world view, core beliefs, structures of relationships, patterns of moral and ethical discourse, political thought and action, experience of and response to racism, cultural motifs, and historical foundations.

The program seeks to provide these educational benefits to all students at the College while providing opportunities for teachers and scholars to engage in meaningful work in this academic area.

The Minor

To complete the minor in black studies, students take one required course, Introduction to Black Studies, and select an additional five courses from among program and departmental electives. For students whose interests are not directly addressed in formal course offerings, the program also offers the opportunity for independent reading and research, at the student's initiative, with the support of a faculty sponsor.

Suggested Sequence*Required Course*

BLS 101 Introduction to Black Studies

Elective Courses

Students must take one course from each of the following series:

Series A—Race and Racism

PSC 416 Race and Politics in the Americas
 SOC 305 Race and Ethnic Relations
 SWK 320 Diversity and Culture in Social Work Practice

Series B—Africa and the African World View

BLS 225 The African World View
 ECN 335 The Economics of Developing Nations
 HIS 344 History of Africa since 1850
 PSC 334 African Politics

Series C—African American History

BLS 210 Topics in African and African American History
 HIS 346 African-American History to 1877
 HIS 347 African-American History Since 1877
 SOC 304 Social Movements
 SOC 325 African-American Women

Series D—Contemporary Black Life

BLS 215 Dimensions of Contemporary Black Life
 BLS 230 Faith and Spirit in the Black Family and Community
 PSC 303 Urban Politics in the U.S.
 SOC 307 Urban Sociology
 SOC 323 Contemporary Social Problems

Series E—Contemporary Black Culture and the Arts

ARH 107 The African-American Artist
 MSC 227 History of Jazz

Special Topics Series

(May meet requirements for any one of Series A through E, depending on topic.)

BLS 480 Seminar in Black Studies
 BLS 490 Independent Reading in Black Studies
 BLS 491 Directed Research Project

The Courses**BLS 101 Introduction to Black Studies**

I SEMESTER, 3 CREDITS

This course familiarizes the student with the foundations of black studies as a scholarly inquiry, introducing the diverse field's most important theoretical approaches, preparing the student for further courses in black studies while building analytical skills and fostering an understanding of black life and culture in the Americas.

BLS 107 The African-American Artist

I SEMESTER, 3 CREDITS

An introduction to African-American achievements in the visual arts, especially painting, from Colonial times to the present. *Same as ARH 107.*

BLS 210 Topics in African and African-American History

I SEMESTER, 3 CREDITS

Black studies begins with black history. African civilization, technology and trade, European colonialism, slavery, the Civil War, Emancipation, Reconstruction, Jim Crow, the northward migration, the civil rights movement, Black Power, and black liberation—these are some important periods and themes that structure historical understanding of Africans in the United States.

BLS 215 Dimensions of Contemporary Black Life

I SEMESTER, 3 CREDITS

Social and cultural analysis provides an understanding of the structures and processes of social and political power. This course examines contemporary issues, achievements and problems of African Americans, their families, and their communities, offering both questions and answers about the persistent inequality and conflict that characterize the black experience in the late 20th century.

BLS 225 The African World View

I SEMESTER, 3 CREDITS

This course introduces African history and culture as an independent aspect of world civilization. Students consider Afrocentrism, post-colonialism, world systems analysis, dependency theory, colonialism, imperialism, state formation, and cultural exchange. The course shows how distinctive African contributions have shaped, and are shaped by, the world's cultures.

BLS 227 History of Jazz

I SEMESTER, 3 CREDITS (Fine Arts Core)

A study of the history of jazz from African music to con-

temporary trends and more popular forms. Emphasis will be placed on styles and performers. Analytical listening will be required. *Same as AMS 227 and MSC 227.*

BLS 230 Faith and Spirit in the Black Family and Community

I SEMESTER, 3 CREDITS

Covers the many ways in which religious practice and faith have contributed to the development of contemporary African-American society and culture. African and African-American Catholicism, conventional and evangelical Protestantism, Islam, traditional African spirituality, syncretic traditions of the Caribbean and South America, voodoo, and contemporary mysticism are considered.

BLS 303 Urban Politics in the United States

I SEMESTER, 3 CREDITS

A survey of city politics in the United States from a variety of theoretical perspectives, using analytical concepts such as social class, pluralism, political economy, and urban regimes. Includes urban elections and party machines, metropolitan development and suburbanization, and racial and ethnic political mobilization. Fulfills the American Politics requirement. *Same as PSC 303.*

BLS 304 Social Movements

I SEMESTER, 3 CREDITS

What was it like to be a part of the 1950s and 1960s U.S. civil rights movement? Examines why people join social movements, how they are organized, why they occur when they do, and why they succeed or fail, and offers a critical evaluation of current theories of social and political movements. *Same as SOC 304.*

BLS 305 Race and Ethnic Relations

I SEMESTER, 3 CREDITS

An analysis of race and ethnic relations in America with special emphasis on the historical and contemporary experience of Native Americans, Latinos, Asian Americans, African Americans, and European Americans. Sociological theory and data are used to examine the structural sources and effects of racism, prejudice, and discrimination. *Same as SOC 305.*

BLS 307 Urban Sociology

I SEMESTER, 3 CREDITS

Identifies the extent of, and reasons for, such urban problems as poverty, crime, and homelessness in cities such

as Providence, New York, Boston, and Chicago. In generating explanations and developing solutions, the course draws on the theories of urban sociologists and on the personal experience of those who confront urban problems. *Same as SOC 307.*

BLS 320 Diversity and Culture in Social Work Practice

I SEMESTER, 3 CREDITS

“Cultural competence” includes awareness of one’s own culture-based worldview, awareness of the worldviews of diverse clients, and skills in working across cultural differences. Such competence will be pursued through reflection and dialogue about students’ own cultures and contacts with others of different cultures in reading, co-curricular exploration, and service learning. *Same as SWK 320.*

BLS 323 Contemporary Social Problems

I SEMESTER, 3 CREDITS (Social Science Core)

Covers the major social problems of contemporary American society. Attention is given to the problems of poverty, racism, sexism, war, the environment, overpopulation, drug use, and crime. An analysis is made of the structural causes and consequences of these issues. *Same as SOC 323.*

BLS 325 African-American Women

I SEMESTER, 3 CREDITS

Focuses on sociological analyses of the constructions and reconstructions of African-American women, examining the interrelationships of gender, race, caste, class, racism, and sexism in the United States, past and present. Topics include the family, male-female relations, poverty, discrimination, social movements, with particular emphasis on origins, consequences, social and individual changes and resistance to change, sociological, and feminist theories. *Same as AMS 325, SOC 325, and WMS 325.*

BLS 334 African Politics

I SEMESTER, 3 CREDITS

Analysis of government and politics in selected African countries, focusing on issues of economic liberalization, democratization and good governance, ethnicity, class, gender, youth, conflicts, and civil wars. Emphasis on evolving state-society and civil-society relations within the context of new political structures and democratic institutions. Fulfills the Comparative Government and Politics requirement. *Same as PSC 334.*

BLS 335 The Economics of the Developing Nations

I SEMESTER, 3 CREDITS

This course surveys theories and policies of developing nations. Attention is given to geography, natural and human resources, the rural and industrial sectors, governmental administration and planning, monetary and fiscal policies, foreign trade and aid, balance of payments, sustainable development (environment and development), integration, and prospects of further development. *Same as ECN 335. Prerequisite: ECN 101 or ECN 102.*

BLS 344 History of Africa Since 1850

I SEMESTER, 3 CREDITS

This survey course will examine the partition of Africa, colonialism, the growth of African nationalism, independence movements, and the politics of the Cold War. Social and cultural issues also will be considered. *Same as HIS 344.*

BLS 346 African-American History to 1877

I SEMESTER, 3 CREDITS

This course examines the African-American experience from the beginning of the slave trade through Reconstruction. Topics include the establishment of slavery in North America, the development of the cotton economy of the South, the rise of anti-slavery, the experience of free blacks, African-American religious development, and slave resistance. *Same as HIS 346.*

BLS 347 African-American History Since 1877

I SEMESTER, 3 CREDITS

This course will examine slavery as a cause of the Civil War, emancipation, Reconstruction, Jim Crow, black intellectuals and black history, the migration of African Americans from the South, the emergence of the civil rights movement, desegregation, the role of Martin Luther King, the Black Power movement, the persistence of racism, and affirmative action programs. *Same as HIS 347.*

BLS 365 Twentieth-Century African American Literature

I SEMESTER, 3 CREDITS

A reading-intensive introduction to 20th century African American fiction, autobiography, drama, and poetry, with particular attention to social and cultural contexts. Writers include Nella Larsen, Ralph Ellison, Amiri Baraka, Toni Morrison, John Edgar Wideman, and Anna Deavere Smith. Focus on race, class, and gender, and on the authors' approaches to the role of literary art in society. *Same as ENG 365.*

BLS 416 Race and Politics in the Americas

I SEMESTER, 3 CREDITS

Advanced, in-depth survey of racial politics in North America, the Caribbean, Central America, and South America. Considers analytical perspectives such as post-colonialism, pan-Africanism, *negritude*, *indigenismo*, critical race theory, racial patriarchy, and the "racial contract." Examines the politics of Indigenous, African-descent, Latino, and Asian and Pacific Islander communities. Fulfills either the American Politics or the Comparative Government and Politics requirement. *Same as PSC 416.*

BLS 480 Seminar in Black Studies

I SEMESTER, 3 CREDITS

The Capstone Seminar in Black Studies offers reading, writing, and small-group discussion in a particular aspect of black studies. Seminar topics will vary. *Prerequisite: Junior or senior status, or instructor's permission.*

BLS 490 Independent Reading in Black Studies

I SEMESTER, 3 CREDITS

Students frequently discover that an area of interest is not addressed directly by existing course offerings. Independent Reading in Black Studies allows the student to design a one-semester program of reading, reflection, and writing in that area of interest. *Prerequisite: Written permission of the program director and the sponsoring faculty member.*

BLS 491 Directed Research Project in Black Studies

I SEMESTER, 3 CREDITS

This course gives students the opportunity to design and carry out a significant research project in some aspect of black studies. The final result of the project may be a long research paper, video documentary, dramatic script or presentation, computer program, or other major work which demonstrates mastery of theory, technique, or subject matter. *Prerequisite: Written permission of the program director and sponsoring faculty member.*

Business Studies Program

Contact Information

Phone: 401.865.2656

Fax: 401.865.2978

Location: Koffler Hall 215

The Faculty

Associate Professor

Ann Galligan Kelley, C.P.A., M.B.A., C.A.G.S., Director

The Program

NOTE: Students are not eligible for this program until they are second-semester freshmen. (Students should enroll as early in their academic careers as possible.) Seniors are not eligible.

There are alternate routes for students to follow in developing careers in business. The traditional business major is a route that many students follow. However, there are other students who are interested in careers in business but do not wish to major in business. Providence College offers a Business Studies Program to satisfy the needs of such students. The program consists of a series of seven business and business-related courses that students can take to supplement a non-business major to provide a foundation for future careers in business. Students who successfully complete the requirements of the program are awarded a certificate in business studies.

Students can combine the Business Studies Program with any non-business major offered by the College. At graduation, the students who pursue the program will receive a degree in their major area along with the certificate in business studies.

The main advantage of the Business Studies Program is that it gives students the opportunity to elect a non-business major and yet still concentrate in business. There is no official major that relates directly to the program. It is not necessary for a student to select a specific business specialty such as accountancy, finance, marketing, or management. The Business Studies Program crosses all of the business and business-related majors. An internship is not required but is strongly encouraged.

The Requirements

Please see course descriptions under the corresponding departments' course listings.

ACC	103	Financial Accounting
MTH	107	Mathematics for Business Analysis I (or any higher level math course)
ECN	101	Principles of Economics: MICRO Human Relations elective (see below)
MKT	205	Marketing Management
FIN	201	Principles of Finance
BSP	440	Business Policy and Decision-Making Analysis Capstone

Human Relations Elective

An introduction to the study of human relations that prevail in the business world. Elements such as group and organizational process, motivation, leadership, social control, and conflict will be studied. Requirement fulfilled by one of the following:

Recommended Course

SOC 335 Human Relations in Business

Alternatives

- MGT 101 Principles of Management
- SOC 340 Organizations in Society
- PSP 202 Foundations of Organizational Service
- PSY 317 Social Psychology
- PSY 100 Intro to Psychology AND
- SOC 101 Intro to Sociology (6 credits)

The Course

BSP 440 Business Policy and Decision-Making Analysis

1 SEMESTER, 3 CREDITS

This course is a senior-level capstone that covers the principles, methods, concepts, and procedures for decision-making. The influences of both quantitative and qualitative factors in decision-making are considered. *Prerequisite: A declared business studies senior and completion of a minimum of five of the program's requirements.*

Alternatives to BSP 440

MGT	489	Capstone Seminar in Strategy
HPM	420	Strategic Management in Health Care
ECN	312	Managerial Economics
MGT	410	Operations Research

Chemistry and Biochemistry

Contact Information

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 Location: Sowa Hall 238

The Faculty

Professors

Carl D. Baer, Ph.D.
 Kathleen A. Cornely, Ph.D.
 Paul T. Czech, Ph.D.
 Mark N. Rerick, Ph.D., Emeritus
 Martin D. Saltzman, Ph.D.

Associate Professors

Sheila M. Adamus, Ph.D.
 John J. Breen III, Ph.D., *Chairperson*
 Kenneth R. Overly, Ph.D.

Assistant Professors

Christopher M. Laperle, Ph.D.
 Jay D. Pike, Ph.D.

The Major

The Department of Chemistry and Biochemistry offers programs of study leading to the degrees of bachelor of science in chemistry, bachelor of arts in chemistry, and bachelor of science in biochemistry.

Chemistry (B.S.)

The bachelor of science program in chemistry is a rigorous one designed to provide in-depth training in all areas of chemistry for those students with a strong interest in research or graduate school. The program is certified by the American Chemical Society. Students must take CHM 309 (Biochemistry) as one of their electives to receive a certified degree.

Chemistry (B.A.)

The bachelor of arts program in chemistry is an extremely flexible one with fewer required courses in chemistry and mathematics offering a wider scope of elective course opportunities, allowing students to tailor a program to meet their individual needs. This flexibility permits additional undergraduate preparation in other diverse areas such as business and economics, biology, mathematics, English, or education. Within the context of the bachelor of arts program, a number of dedicated programs have been developed that prepare students seeking to enter certain specialized careers.

The Pre-Medical/Dental Option

This is designed to prepare students intending to pursue careers in medicine and dentistry. Electives are dedicated to those courses required and/or strongly recommended for admission to medical or dental schools. For information about the College's Premedical Sciences and Health Professions Programs, see page 210.

The Secondary Education-Chemistry Teacher Option

This is designed to provide training in all areas of chemistry for those seeking careers as high school chemistry teachers. Students choose elective courses in education, and the combination of chemistry and education courses has been approved by the Interstate Certification Compact and allows the student to meet the certification requirements of the State of Rhode Island and most other states.

Biochemistry (B.S.)

The bachelor of science degree program in biochemistry is a rigorous course of study that combines the chemistry courses required for the bachelor of arts degree with selected courses in biology and biochemistry. The biochemistry degree program is excellent preparation for students interested in medical and dental school as well as students interested in graduate school in biochemistry or molecular biology. This program is certified by the American Chemical Society.

The B.A. and B.S. programs may also be combined with a variety of other academic minors and majors including biology, mathematics, and business studies.

Participation in an undergraduate research project guided by members of the faculty is strongly encouraged in all programs during the junior year, the summer after the junior year, and the senior year. Research is conducted within the College's facilities or at a variety of research institutions across the United States. The results of these original research projects are often presented by students at regional and national meetings of professional societies.

Suggested Sequence: Chemistry (B.S.)*Freshman Sem. 1*

DWC	101	Devel of Western Civilization	5
MTH	131	Calc. and Analytical Geometry I	3
CHM	121	Introductory Chemistry	4
		Social Science Elective	3

Freshman Sem. 2

DWC	102	Devel of Western Civilization	5
MTH	132	Calc and Analytical Geometry II	3
CHM	122	Introductory Chemistry	4
		Social Science Elective	3

Sophomore Sem. 1

DWC	201	Devel of Western Civilization	5
MTH	223	Calc and Analytical Geometry III	3
EPS	101	General Physics	4
CHM	221	Organic Chemistry	4

Sophomore Sem. 2

DWC	202	Devel of Western Civilization	5
MTH	304	Differential Equations	3
EPS	102	General Physics	4
CHM	222	Organic Chemistry	4

Junior Sem. 1

CHM	322	Physical Chemistry	3
CHM	322L	Physical Chemistry Laboratory	1
CHM	331	Advanced Analytical Chem I	4
CHM	381	Chemistry Seminar	1
PHL		Philosophy Elective	3
THL		Theology Elective: Group I	3
		Non-Departmental Elective	3

Junior Sem. 2

CHM	321	Physical Chemistry	3
CHM	321L	Physical Chemistry Laboratory	1
CHM	332	Organic Analysis	4
CHM	382	Chemistry Seminar	1
PHL		Philosophy Elective: Ethics	3
THL		Theology Elective: Group II	3
		Non-Departmental Elective	3

Senior Sem. 1

CHM	401	Inorganic Chemistry	4
CHM	481	Chemistry Seminar	1
CHM		Chemistry Elective**	3
		Fine Arts Elective	3
		Free Electives (2)	6

Senior Sem. 2

CHM	432	Advanced Analytical Chem II	4
CHM	482	Chemistry Seminar	1
		Science Elective*	3
		Non-Departmental Elective	3
		Free Electives (2)	6

*Chosen from BIO 103-104 or advanced courses in biology, chemistry, physics, or mathematics.

**Chosen from among CHM 309 Biochemistry I (must be chosen for ACS-certified degree), CHM 312 Biochemistry II, CHM 402 Advanced Inorganic Chemistry, CHM 442 Advanced Organic Chemistry, or CHM 470 Special Topics in Biochemistry

NOTE: It is recommended that students consult with their advisors about the availability of chemistry and science elective courses, since some are not offered every year.

Suggested Sequence: Biochemistry (B.S.)*Freshman Sem. 1*

DWC	101	Devel of Western Civilization	5
MTH	131	Calculus & Analytical Geometry I	3
CHM	121	Introductory Chemistry	4
BIO	103	General Biology	4

Freshman Sem. 2

DWC	102	Devel of Western Civilization	5
MTH	132	Calculus & Analytical Geometry II	3
CHM	122	Introductory Chemistry	4
BIO	104	General Biology	4

Sophomore Sem. 1

DWC	201	Devel of Western Civilization	5
EPS	101	General Physics	4
CHM	221	Organic Chemistry	4
		Social Science Elective	3

Sophomore Sem. 2

DWC	202	Devel of Western Civilization	5
EPS	102	General Physics	4
CHM	222	Organic Chemistry	4
		Social Science Elective	3

Junior Sem. 1

CHM	309	Biochemistry I	3
CHM	331	Advanced Analytical Chemistry I	4
CHM	381	Chemistry Seminar	1
PHL		Philosophy Elective	3
THL		Theology Elective: Group I	3
		Non-Departmental Elective	3

Junior Sem. 2

CHM 302	Physical Chemistry	3
CHM 302L	Physical Chemistry Laboratory	1
CHM 312	Biochemistry II	3
CHM 382	Chemistry Seminar	1
PHL	Philosophy Elective: Ethics	3
THL	Theology Elective: Group II	3
	Non-Departmental Elective	3

Senior Sem. 1

BIO 308	Modern Genetics	4
CHM 401	Inorganic Chemistry	4
CHM 481	Chemistry Seminar	1
	Fine Arts Elective	3
	Non-Departmental Elective	3
	Free Elective	3

Senior Sem. 2

BIO	Biology Elective**	3-4
CHM 310L	Biochemistry Laboratory	3
CHM 482	Chemistry Seminar	1
CHM	Chemistry Elective*	3-4
	Free Electives (2)	6

*Chosen from 300/400 level courses in chemistry excluding Research.

**Chosen from among BIO 215 Histology and Cytology, BIO 320 Developmental Biology, BIO 405 Physiology, BIO 407 Microbiology, BIO 412 Bacterial Physiology, BIO 413 Cell Signaling, BIO 416 Immunology, or BIO 418 Biotechnology.

Suggested Sequence: Chemistry (B.A.)

Freshman Sem. 1

DWC 101	Devel of Western Civilization	5
MTH 131	Calc and Analytical Geometry I	3
CHM 121	Introductory Chemistry	4
	Social Science Elective	3

Freshman Sem. 2

DWC 102	Devel of Western Civilization	5
MTH 132	Calc and Analytical Geometry II	3
CHM 122	Introductory Chemistry	4
	Social Science Elective	3

Sophomore Sem. 1

DWC 201	Devel of Western Civilization	5
EPS 101	General Physics	4
CHM 221	Organic Chemistry	4
	Non-Departmental Elective	3

Sophomore Sem. 2

DWC 202	Devel of Western Civilization	5
EPS 102	General Physics	4
CHM 222	Organic Chemistry	4
	Non-Departmental Elective	3

Junior Sem. 1

CHM 331	Advanced Analytical Chem I	4
CHM 381	Chemistry Seminar	1
PHL	Philosophy Elective	3
	Fine Arts Elective	3
	Free Electives* (2)	6

Junior Sem. 2

CHM 302	Physical Chemistry**	3
CHM 382	Chemistry Seminar	1
PHL	Philosophy Elective: Ethics	3
	Non-Departmental Elective	3
	Free Electives* (2)	6

Senior Sem. 1

CHM 401	Inorganic Chemistry	4
CHM 481	Chemistry Seminar	1
THL	Theology Elective: Group I	3
	Free Electives* (3)	9

Senior Sem. 2

	Science Elective***	3
CHM 482	Chemistry Seminar	1
THL	Theology Elective: Group II	3
	Free Electives* (3)	9

*Election of a computer science course for one of the free electives is strongly recommended.

**CHM 321 may be substituted for CHM 302.

***Chosen from BIO 103-104 or advanced courses in biology, chemistry, physics, or mathematics.

Suggested Sequence: Chemistry (B.A.)
Pre-Medical/Dental Option

Freshman Sem. 1		Credits
DWC 101	Devel of Western Civilization	5
MTH 131	Calc and Analytical Geometry I	3
CHM 121	Introductory Chemistry	4
	Social Science Elective (Psychology)	3

Freshman Sem. 2

DWC 102	Devel of Western Civilization	5
MTH 132	Calc and Analytical Geometry II	3

CHM 122 Introductory Chemistry 4
 Social Science Elective (Sociology) 3

Sophomore Sem. 1

DWC 201 Devel of Western Civilization 5
 EPS 101 General Physics 4
 CHM 221 Organic Chemistry 4
 Non-Departmental Elective 3

Sophomore Sem. 2

DWC 202 Devel of Western Civilization 5
 EPS 102 General Physics 4
 CHM 222 Organic Chemistry 4
 Non-Departmental Elective 3

Junior Sem. 1

CHM 331 Advanced Analytical Chemistry I 4
 CHM 381 Chemistry Seminar 1
 BIO 103 General Biology* 4
 THL Philosophy Elective 3
 CHM 309 Biochemistry I 3
 Free Elective** 3

Junior Sem. 2

CHM 302 Physical Chemistry*** 3
 CHM 382 Chemistry Seminar 1
 BIO 104 General Biology 4
 PHL Philosophy Elective: Ethics 3
 Non-Departmental Elective 3
 Free Elective** 3

Senior Sem. 1

CHM 401 Inorganic Chemistry 4
 CHM 481 Chemistry Seminar 1
 BIO 405 Physiology 4
 THL Theology Elective: Group I 3
 Fine Arts Elective 3
 Free Elective ** 3

Senior Sem. 2

BIO 201 Comparative Anatomy 4
 CHM 482 Chemistry Seminar 1
 BIO 308 Genetics 4
 THL Theology Elective: Group II 3
 Free Elective** 3
 Free Elective** 3

**Election of a computer science course for one of the free electives is strongly recommended.

***CHM 321 may be substituted for CHM 302.

Suggested Sequence: Chemistry/Secondary Education (B.A.)

Freshman Sem. 1 Credits

DWC 101 Devel of Western Civilization 5
 MTH 131 Calc and Analytical Geometry I 3
 CHM 121 Introductory Chemistry 4
 Social Science Elective (Psychology) 3

Freshman Sem. 2

DWC 102 Devel of Western Civilization 5
 MTH 132 Calc and Analytical Geometry II 3
 CHM 122 Introductory Chemistry 4
 Social Science Elective (Principles Econ: Micro) 3

Sophomore Sem. 1

DWC 201 Devel of Western Civilization 5
 EPS 101 General Physics 4
 CHM 221 Organic Chemistry 4
 EDU 201 Educational Psychology 3

Sophomore Sem. 2

DWC 202 Devel of Western Civilization 5
 EPS 102 General Physics 4
 CHM 222 Organic Chemistry 4
 EDU 206 Principles of Secondary Ed 3
 EDU 206L Principles of Secondary Ed Lab 1

Junior Sem. 1 Credits

CHM 331 Advanced Analytical Chemistry I 4
 CHM 381 Chemistry Seminar 1
 BIO 103 General Biology* 4
 PHL Philosophy Elective 3
 EDU 401 Educational Measurement 3
 EDU 401L Educational Measurement Lab 1
 Non-Departmental Elective 3

Junior Sem. 2

CHM 302 Physical Chemistry** 3
 CHM 382 Chemistry Seminar 1
 EDU 303 Child w Spec. Needs in Reg. Class 3
 EDU 303L Child w Spec. Needs in Reg. Class Lab 1
 THL Theology Elective: Group I 3
 PHL Philosophy Elective: Ethics 3
 Non-Departmental Elective 3

*The 3-credit science elective requirement of the B.A. program is automatically fulfilled by any biology course within this option.

Senior Sem. 1

CHM 401	Inorganic Chemistry	4
CHM 481	Chemistry Seminar	1
EDU 301	Foundations of Education	3
EDU 412	Teach Science in Sec Schools	3
EDU 412L	Teach Sci in Sec Schools Field Exp	1
THL	Theology Elective: Group II	3
	Non-Departmental Elective	3

Senior Sem. 2

EDU 450	Student Teach in Sec School	9
CHM 482	Chemistry Seminar	1
	Fine Arts Elective	3
	Free Elective (Comp Sci)	3

*The 3-credit science elective requirement of the B.A. program is automatically fulfilled by BIO 103 within this option. BIO 103 is required in order to meet the standards of the Interstate Certification Compact.

**CHM 321 may be substituted for CHM 302.

The Courses

CHM 101-102 General Chemistry

2 SEMESTERS, 4 CREDITS EACH (Natural Science Core*)

The fundamental principles of chemistry, including laboratory instruction in general chemistry and qualitative analysis. For biology majors. (Lectures 3 hours, laboratory 4 hours.) Not open to students with credit in CHM 121-122. Prerequisite: CHM 101 or CHM 121 is a prerequisite for CHM 102.

*See page 43-44 for specific policies related to the Natural Science Core requirement.

CHM 105 Contemporary Chemistry

1 SEMESTER, 3 CREDITS (Natural Science Group I Core)

Application of chemical principles to the solutions of environmental and societal problems facing man in today's world and in the future. Designed for non-science majors; no prior knowledge of chemistry is required or assumed. (Lectures 3 hours.)

CHM 106 Chemistry and Life

1 SEMESTER, 3 CREDITS (Natural Science Group II Core)

A study of how chemistry affects human life. The course will focus on how chemistry has influenced recent developments in areas such as biotechnology, genetic engineering, and drug development, which are at the frontiers of

biology and chemistry. Designed for non-science majors; no prior knowledge of chemistry or biology is required or assumed. (Lectures 3 hours.)

CHM 121-122 Introductory Chemistry

2 SEMESTERS, 4 CREDITS EACH (Natural Science Core*)

An introductory chemistry course covering topics such as periodic trends, descriptive chemistry of selected elements, atomic structure, thermodynamics, gas laws, equilibrium, molecular structure, chemical bonding, oxidation-reduction, acids and bases, and kinetics. Laboratory instruction stresses quantitative analysis. For chemistry, biochemistry, and engineering-physics majors. (Lectures 3 hours, laboratory 4 hours.) Not open to students with credit in CHM 101-102. Prerequisite: CHM 101 or CHM 121 is a prerequisite for CHM 122.

*See page 43-44 for specific policies related to the Natural Science Core requirement.

CHM 201 - 202 Organic Chemistry

2 SEMESTERS, 4 CREDITS EACH

A study of the compounds of carbon utilizing a problem-oriented approach both in lecture and laboratory that emphasizes the use of spectroscopic methods. For biology majors. (Lectures 3 hours, laboratory 4 hours.) Not open to students with credit in CHM 221-222. Prerequisites: CHM 102 or CHM 122 is a prerequisite for CHM 201. CHM 201 or CHM 221 is a prerequisite for CHM 202.

CHM 221 - 222 Organic Chemistry

2 SEMESTERS, 4 CREDITS EACH

A study of the compounds of carbon utilizing a problem-oriented approach both in lecture and laboratory that emphasizes the use of spectroscopic methods. For chemistry and biochemistry majors. (Lectures 3 hours, laboratory 4 hours.) Not open to students with credit in CHM 201-202. Prerequisites: CHM 102 or CHM 122 is a prerequisite for CHM 221. CHM 201 or CHM 221 is a prerequisite for CHM 222.

CHM 302 Physical Chemistry

1 SEMESTER, 3 CREDITS

The elements of physical chemistry. A study of the physical basis for chemical thermodynamics, kinetics, and equilibria with some biological applications. (Lectures 3 hours.) Prerequisite: B.A. chemistry majors and biochemistry majors.

CHM 302L Physical Chemistry Laboratory

I SEMESTER, 1 CREDIT

Laboratory course to accompany Chemistry 302. (Laboratory 4 hours.)

CHM 309 Biochemistry I

I SEMESTER, 3 CREDITS

An overview of the biochemical reactions associated with living cells. Topics include protein structure/function relationships; enzyme structure, mechanism, and inhibition; carbohydrate and lipid structure. The biochemical reactions of the cell are surveyed, including glycolysis, Krebs' cycle, electron transport, gluconeogenesis, and lipid and amino acid metabolism. The case study approach is used throughout. (Lectures 3 hours.) *Prerequisite:* CHM 201 or CHM 221.

CHM 310L Biochemistry Laboratory

I SEMESTER, 3 CREDITS

An integrated lecture/laboratory course designed to teach students fundamental laboratory techniques in biochemistry. Experiments include buffer preparation, assays for the detection of biological components, protein purification, SDS-PAGE, Western blotting, enzyme kinetics, DNA isolation, and PCR analysis. Lectures cover experimental theory and methods of analysis. (Lectures 2 hours, laboratory 4 hours.) *Prerequisite:* CHM 309. CHM 310L may not be taken concurrently with CHM 309.

CHM 312 Biochemistry II

I SEMESTER, 3 CREDITS

This course is an extension of many of the topics covered in Biochemistry I. The course focuses on the biochemistry of the cell, including molecular genetics and control of gene expression, intracellular compartments and cell sorting, vesicular traffic in the secretory and endocytic pathways, signal transduction, and the nature of the cytoskeleton. (Lectures 3 hours.) *Prerequisite:* CHM 309.

CHM 321 Physical Chemistry

I SEMESTER, 3 CREDITS

An examination of the equilibrium behavior of physical/chemical systems from the macroscopic and microscopic points of view. Thermodynamics with applications to phase and solution equilibria and reaction kinetics. For B.S. chemistry majors. (Lectures 3 hours.)

CHM 321L Physical Chemistry Laboratory

I SEMESTER, 1 CREDIT

Laboratory course to accompany Chemistry 321. (Laboratory 4 hours.)

CHM 322 Physical Chemistry

I SEMESTER, 3 CREDITS

An introduction to the quantum theory of chemical systems. Elements of non-relativistic quantum mechanics; electronic structure of atoms and molecules; the study of molecular structure by spectroscopic and other techniques; chemical bonding. (Lectures 3 hours.) For B.S. chemistry majors.

CHM 322L Physical Chemistry Laboratory

I SEMESTER, 1 CREDIT

Laboratory course to accompany Chemistry 322. (Laboratory 4 hours.)

CHM 331 Advanced Analytical I

I SEMESTER, 4 CREDITS

The theory and practice of modern instrumental methods are presented. Emphasis is placed on the more important spectroscopic methods and chromatography, which are covered in depth. (Lectures 3 hours, laboratory 4 hours.)

CHM 332 Organic Analysis

I SEMESTER, 4 CREDITS

The principles and practice of the chemical and spectroscopic methods used in the elucidation of the structure of organic compounds. (Lectures 3 hours, laboratory 4 hours.)

CHM 381 - 382/481 - 482 Chemistry Seminar

4 SEMESTERS, 1 CREDIT EACH SEMESTER

Research on a subject of current chemical interest is followed by an oral presentation and discussion. Each student is responsible for giving one seminar in both the junior and senior years. In addition, guest speakers from academia and industry may speak to the class.

CHM 395 - 396 Research

2 SEMESTERS, CREDIT HOURS VARIABLE

Students in the junior year may elect to engage in an original laboratory or theoretical problem in chemistry in collaboration with a member of the staff. Research may be taken at the student's option for one, two, or three credits.

CHM 401 Inorganic Chemistry

I SEMESTER, 4 CREDITS

Structure and bonding in inorganic systems are the general subjects of this course. Both main group and transition metal chemistry are discussed. (Lectures 3 hours, laboratory 4 hours.)

CHM 402 Advanced Inorganic Chemistry

I SEMESTER, 3 CREDITS

A survey of the descriptive chemistry of the elements. In addition, time is devoted to the study of bioinorganic systems, organometallic chemistry, and pollution. (Lectures 3 hours.) *Prerequisite:* CHM 401.

CHM 432 Advanced Analytical II

I SEMESTER, 4 CREDITS

A continuation of Chemistry 331. In this semester topics include mass spectrometry, electrochemistry, x-ray methods, and special topics. (Lectures 3 hours, laboratory 4 hours.)

CHM 442 Advanced Organic Chemistry

I SEMESTER, 3 CREDITS

The modern theories of organic structure and physical properties and studies of modern theories of organic reaction mechanisms. (Lectures 3 hours.)

CHM 470 Special Topics in Biochemistry

I SEMESTER, 3 CREDITS

This course will cover advanced topics not covered in Biochemistry I and II. Course materials will include current papers from the scientific literature. Course content will vary according to the interests of the students and the instructor. (Lectures 3 hours.) *Prerequisite:* CHM 309.

CHM 495-496 Research

2 SEMESTERS, CREDIT HOURS VARIABLE

Students in the senior year may elect to engage in an original laboratory or theoretical problem in chemistry in collaboration with a member of the staff. Research may be taken at the student's option for one, two, or three credits.

Classics

The Faculty

Assistant Professors

Fred K. Drogula, Ph.D.

John M. Lawless, Ph.D.

The Courses**CLA 201, 202 Classics in Translation**

2 SEMESTERS, 3 CREDITS EACH

The courses are intended as introductions to masterpieces of Greek and Roman literature. To the extent possible, students will read complete works by major Greek and Roman authors in the best modern translations available. Each semester will focus on some great theme in these ancient literatures. Course may be repeated for credit.

CLA 490, 491 Independent Study

2 SEMESTERS, 3 CREDITS EACH

GRK 101-102 Elementary Greek

2 semesters, 3 credits each

An introduction to the ancient Greek language with systematic presentation of forms and grammar and reading of adapted stories and fables.

LAT 101-102 Elementary Latin

2 SEMESTERS, 3 CREDITS EACH

A course in the fundamentals of the Latin language, for those who wish to begin the study of Latin. Grammar and reading of adapted stories and fables.

LAT 201-202 Intermediate Latin

2 SEMESTERS, 3 CREDITS EACH

This course reviews and continues the study of the fundamentals of the language and progresses to reading selections from Latin prose and poetry.

Development of Western Civilization

Contact Information

Phone: 401.865.2231

Fax: 401.865.1730

Location: Moore Hall 101

The Program

The Development of Western Civilization Program, inaugurated in 1971-72, is the core of the general education curriculum at Providence College. During the freshman and sophomore years, all students are required to enroll in a two-year sequence of courses in the Development of Western Civilization. Instructed by a team of four faculty drawn from the disciplines of history, literature, philosophy, and theology, students attend classes five days a week, earning five credits each semester for a total of 20 credits.

Two ordering principles provide the structure of the course. The first is chronology. Over two years of study, students examine the major developments that have shaped Western Civilization from its beginnings in Mesopotamia, Egypt, Israel, and Greece, at the start of the first semester of the freshman year, to the current trends and developments marking the contemporary Western world, toward the end of the second semester of the sophomore year.

The chronological approach is deepened by the second principle: interdisciplinary study. The interdisciplinary structure of the course means that all of the four major fields of study, together with the fine arts, are examined in relation to the larger developments of each time period. In exploring ancient Greek civilization, for instance, students consider the *polis* or city-state as the key political unit of Greek life, then link the *polis* of Athens to their reading of such Greek tragedies as Sophocles' *Oedipus Rex*, and then link these historical and literary developments to the thought of the Athenian philosophers, Socrates, Plato, and Aristotle. Similarly, in the second-year course, students examine World War I and its aftermath as the historical framework for the religious thought of Karl Barth, the literature of Kafka, the philosophy of logical positivism, and the pervasive metaphor of the wasteland. Thus chronology is never allowed to be mere chronicling, and fundamental ordering themes are stressed.

The Goals of the Program

In requiring two years of intensive, interdisciplinary study of Western Civilization for all students regardless of their concentrations or professional goals, Providence College charts an ambitious path and sets a demanding academic standard. There are two main goals that the College aims to achieve.

The first is to foster the intellectual development of students as individuals. We believe that college should provide students the opportunity to gain a deeper understanding of both their world and themselves. The study of Western Civilization, in its moments of majesty and madness, glory and shame, provides a key to self-understanding, for this civilization has been largely responsible for shaping who and what we are, both in our social and in our more deeply personal selves. Tertullian long ago posed the famous question, "What has Athens to do with Jerusalem?" We ask students to confront with honesty similar questions: What do Aristotle and Aquinas, Kant and Kafka, Darwin and Dostoevski, Sartre and Solzhenitsyn have to do with us or say to us? By acquiring an understanding of the development of Western Civilization students acquire a richer appreciation of the perennial questions that we all must ask even as we grow into the future.

Intellectual growth entails the development of academic skills. The program requires rigorous discipline from students in their first two years of college. Effective reading and writing and thinking; analysis and synthesis of information and concepts; and understanding of key events, ideas, and forces that have shaped the Western world all contribute to the education Providence College seeks to provide. By acquiring an understanding of the development of Western Civilization, students acquire a basis for understanding themselves and shaping their future. They also acquire a basis for understanding other cultures and respecting their autonomous development. At a time when critics often decry the decline in higher education of fundamental knowledge and thought, Providence College continues in this program to stress students' growth in understanding issues essential to an education in the humanities.

The second goal of the program is to provide students with a basis for further study. The widespread fragmentation in higher education indicates that the complex reality of the civilization we seek to understand cannot be encompassed by any single discipline. The complementary perspectives of several disciplines working together and learning from one another offer a more complete and critical way of exploring major issues.

Consequently, the faculty members who teach together as a team instructing a Western Civilization section not only impart the knowledge of their own discipline; they also link this knowledge to the other disciplines in order to examine the common questions, issues, and patterns of thought characteristic of particular times and places in the history of Western Civilization. Individual instructors may, of course, advance their own views, but the program as a whole does presuppose a view that history is providential, not merely sequential or meaningless.

NOTE: DWC 101 is waived for students transferring to Providence College for the second semester of their freshman year; however, these students must take an additional course in either theology, philosophy, literature, or history unless this is accomplished through the requirements of the transfer student's major or minor. All other transfer students are required to complete only one year of Development of Western Civilization. They may choose either the DWC 101/102 or the DWC 201/202 sequence.

The Courses

DWC 101 Development of Western Civilization I

I SEMESTER, 5 CREDITS (DWC CORE)

This interdisciplinary course examines the civilization of the West from its beginnings in the ancient Near East: from its classical Greek and Hebraic roots through the rise of the Roman Republic and Empire, the spread of Christianity, and the decline of the West under the Barbarian Invasions while the Near East continued to flourish under the Byzantine Empire and Islam.

DWC 102 Development of Western Civilization II

I SEMESTER, 5 CREDITS (DWC CORE)

This interdisciplinary course examines the making of Europe: the rise of the West from under the material ascendancy of Byzantium and Islam to the High Middle Ages, the Renaissance and Reformation, and the Counter-Reformation and Baroque. Within Christendom, attention is given to political development from feudalism to the rise of the nation state and the severing of Christian unity.

DWC 201 Development of Western Civilization III

I SEMESTER, 5 CREDITS (DWC CORE)

This interdisciplinary course begins with the Enlightenment and proceeds to the last quarter of the 19th century, examining the situation of modernity as a complex interplay of three worldviews: the Christian, the Enlightenment, and the Romantic. Within the political situation of national competition, economic rivalry, and imperialism, attention is given to the clash of worldviews.

DWC 202 Development of Western Civilization IV

I SEMESTER, 5 CREDITS (DWC CORE)

This interdisciplinary course examines the West from the closing years of the 19th century and, continuing the examination of modernity as a complex interplay of three worldviews, proceeds to the present with the fall of communism and the papacy of John Paul II. The United States becomes prominent for the first time, but Western Civilization becomes increasingly global.

Economics

Contact Information

Phone: 401.865.2194
 Fax: 401.865.1264
 Location: Sullivan Hall 111

The Faculty

Professor

Rev. Albino Barrera, O.P., Ph.D.

Associate Professors

Nazma Latif-Zaman, Ph.D.
 MaryJane Lenon, Ph.D.
 Francis T. O'Brien, M.A.
 William J. Simeone, Ph.D.

Assistant Professors

Fang Dong, Ph.D.
 Alan L. Kessler, Ph.D.
 Rev. William Paul Marquis, O.P., Ph.D., *Chairperson*
 Rev. Allen B. Moran, O.P., Ph.D.
 George F. Sawdy, Ph.D.

Instructor

Edwin P. Palumbo, M.A.

The Major

Economics is a broad-ranging discipline both in the questions it asks and the methods it uses to seek answers. It draws upon history, political science, philosophy, sociology, law, psychology, and mathematics in the analysis of social and economic issues.

The Department of Economics at Providence College offers a broad liberal arts program. The programs of study in the economics department offer the student significant flexibility in course structure; this flexibility allows the student majoring in economics to select courses consistent with his or her career objectives. In addition, the economics major is easily combined with other majors/minors.

The bachelor's degree in economics prepares an individual for either immediate employment in a wide variety of career areas or for postgraduate study in economics, business, law, public administration, or related fields.

Course Requirements and Concentration Options for Economics Majors at Providence College

Students majoring in economics at Providence College may choose between three concentration areas: economics, business economics, and quantitative economics. All three concentrations have a common core curriculum that introduce and develop the key tools and theories necessary for the study of economics. These core courses in the major are:

ECN	101	Principles of Microeconomics
ECN	102	Principles of Macroeconomics
ECN	201	Microeconomic Analysis
ECN	202	Macroeconomic Analysis
ECN	214	Introduction to Econometrics (with computer lab)

Economics Major

This major serves as the core program of the Department of Economics. Its purpose is to prepare the student for entry into a profession as well as for graduate work in economics, business, or related disciplines.

In addition to the five core courses in the major (listed above), students choose from a wide array of upper-division (300-400 level) economics electives to fulfill their remaining economics course requirements for the major. These electives enable the economics major to gain depth and breadth in particular areas of economics and are closely related to career paths students may be interested in pursuing. Of the seven upper-division electives, at least one course must be a 400-level economics course. Economics majors must also complete a one-semester introductory mathematics course (MTH 108, 109, or 131) and an Introduction to Statistics course (MTH 217).

To encourage our majors to obtain a broad and comprehensive understanding of the issues related to their field of study, economics majors have the option of fulfilling one of their economics electives by taking a related course from another department or program. All course substitutions must be made in consultation with the student's faculty advisor and require the prior approval of the economics department chair.

Economics majors must also complete a one-semester introductory mathematics course and a course in introductory statistics.

Suggested Sequence: Economics

			Credits
<i>Freshman Sem. 1</i>			
DWC 101	Devel of Western Civilization		5
ECN 101	Prin of Microeconomics		3
MTH	Intro Math (MTH 108, 109, or 131)		3
	Fine Arts Elective		3
<i>Freshman Sem. 2</i>			
DWC 102	Devel of Western Civilization		5
ECN 102	Prin of Macroeconomics		3
PHL	Philosophy Elective		3
ENG 101	Freshman Writing Seminar		3
	OR		
	Non-Departmental Elective		
<i>Sophomore Sem. 1</i>			
DWC 201	Devel of Western Civilization		5
	Natural Science Elective		3
MTH 217	Intro to Statistics		3
ECN 201	Microeconomic Analysis		3
<i>Sophomore Sem. 2</i>			
DWC 202	Devel of Western Civilization		5
	Natural Science Elective		3
ECN 202	Macroeconomic Analysis		3
ECN 214	Intro to Econometrics (with lab)		4
<i>Junior Sem. 1</i>			
ECN	Economics Elective		3
THL	Theology Elective (Group 1)		3
	Non-Departmental Elective		3
	Free Electives (2)		6
<i>Junior Sem. 2</i>			
ECN	Economics Electives (2)		6
	Non-Departmental Elective		3
	Free Electives (2)		6
<i>Senior Sem. 1</i>			
ECN	Economics Electives (2)		6
PHL	Philosophy Elective (Ethics)		3
	Free Electives (2)		6
<i>Senior Sem. 2</i>			
ECN	Economics Electives (2)		6
THL 376	Catholic Social Thought		3
	Free Electives (2)		6
Required: ECN 101, 102, 201, 202, 214, and 21 credit hours of upper-division electives; three credits of these must be at the 400 level. One related course from another department may ful-			

fill one upper-division economics elective with permission of the economics department chair. Also required: MTH 108, 109, or 131; MTH 217; and THL 376.

NOTE: The above-suggested sequence of courses reflects a typical program of study. The sequence may be modified to accommodate student needs and course scheduling arrangements.

Business Economics Major

This major is designed for the student who expects to be working in the business or government sectors of the economy, but wishes to take advantage of liberal arts courses in philosophy, humanities, and social sciences to acquire the flexibility necessary to succeed in new situations and to master new information. This concentration differs from the concentration in economics in the breadth of knowledge required of functional business fields and in the areas of application of economic analysis.

The business economics major includes all the course requirements of the economics major with the addition of several required courses in related business fields: Financial Accounting (ACC 103) and Managerial Finance I (FIN 207). Business economics majors are also required to develop their writing skills by taking Intermediate Writing (ENG 301). All course substitutions must be made in consultation with the student's faculty advisor and require the prior approval of the economics department chair.

Beyond their required courses, business economics majors choose an additional seven courses from among the department's upper-division electives. At least one course must be a 400-level economics course.

Suggested Sequence: Business Economics

			Credits
<i>Freshman Sem. 1</i>			
DWC 101	Devel of Western Civilization		5
ECN 101	Prin of Microeconomics		3
MTH	Intro Math (MTH 108, 109, or 131)		3
ENG 101	Freshman Writing Seminar		3
<i>Freshman Sem. 2</i>			
DWC 102	Devel of Western Civilization		5
ECN 102	Prin of Macroeconomics		3
	Free Elective		3
ACC 103	Financial Accounting		3

Sophomore Sem. 1

DWC	201	Devel of Western Civilization	5
		Natural Science Elective	3
ECN	201	Microeconomic Analysis	3
MTH	217	Intro to Statistics	3

Sophomore Sem. 2

DWC	202	Devel of Western Civilization	5
		Natural Science Elective	3
ECN	202	Macroeconomic Analysis	3
ECN	214	Intro to Econometrics (with lab)	4

Junior Sem. 1

FIN	207	Managerial Finance	3
ECN		Economics Elective	3
THL		Theology Elective (Group 1)	3
ENG	301	Intermediate Writing	3
PHL		Philosophy Elective	3

Junior Sem. 2

ECN		Economics Electives (2)	6
PHL		Philosophy Elective (Ethics)	3
		Non-Departmental Elective	3
		Fine Arts Elective	3

Senior Sem. 1

ECN		Economics Electives (2)	6
THL	376	Catholic Social Thought	3
		Non-Departmental Elective	3
		Free Elective	3

Senior Sem. 2

ECN		Economics Electives (2)	6
		Free Electives (3)	9

Required: ECN 101, 102, 201, 202, and 214, and 21 credit hours of upper-division electives; three of those credits must be at the 400 level. One related course from another department may fulfill one upper-division economics elective with permission of the economics department chair. Also required: MTH 108, 109, or 131; MTH 217; ACC 103; FIN 207; THL 376; and ENG 301.

NOTE: The above-suggested sequence of courses reflects a Typical program of study. The sequence may be modified to accommodate student needs and course scheduling arrangements.

Quantitative Economics Major

This major is designed to allow students to develop strong quantitative skills within the context of the economics major. It is a very fruitful course of study for the student who plans to pursue graduate work in economics, business, or other areas in the social sciences. It also prepares students for immediate employment in careers requiring economic research.

The quantitative economics major builds upon the five courses in the core curriculum of the major and adds Mathematics for Economists I (ECN 315), Econometric Models (ECN 314), and one additional quantitative course from the following list: Forecasting (ECN 409), Seminar in Advanced Econometrics (ECN 486), or Mathematical Economics II (ECN 415). Together, these courses fulfill three of the economics electives required for an economics major. The remaining four economics electives may be selected from the list of upper-division economics electives.

Quantitative economics majors develop a supporting area of quantitative electives that include three upper-division courses (nine credits) from within or across the departments of math, computer science, engineering-physics-systems, accounting, finance, or management. These courses must form a coherent unit and allow for further integration of quantitative analysis into the curriculum.

Suggested Sequence: Quantitative Economics

			Credits
<i>Freshman Sem. 1</i>			
DWC	101	Devel of Western Civilization	5
ECN	101	Prin of Microeconomics	3
MTH	109	Calculus I	3
		OR	
MTH	131	Calc & Analytical Geom I	
ENG	101	Freshman Writing Seminar	3
		OR	
		Non-departmental Elective	
<i>Freshman Sem. 2</i>			
DWC	102	Devel of Western Civilization	5
ECN	102	Prin. of Macroeconomics	3
PHL		Philosophy Elective	3
		OR	
MTH	110	Calculus II	3
		OR	
MTH	132	Calc & Analytical Geom II	

Sophomore Sem. 1

DWC	201	Devel of Western Civilization	5
		Natural Science Elective	3
ECN	201	Microeconomic Analysis	3
MTH	217	Introduction to Statistics	3

Sophomore Sem. 2

DWC	202	Devel of Western Civilization	5
		Natural Science Elective	3
ECN	202	Macroeconomic Analysis	3
ECN	315	Mathematics for Economists I	3

Junior Sem. 1

ECN	214	Intro to Econometrics (with lab)	4
ECN		Economics Elective	3
		Non-Departmental Elective from supporting area	3
ECN		Economics Elective	3
THL		Theology Elective (Group 1)	3

Junior Sem. 2

ECN	314	Econometric Models	3
ECN		Economics Elective	3
THL	376	Catholic Social Thought	3
		Non-Departmental Elective from supporting area	3
		Free Elective	3

Senior Sem. 1

ECN	409	Intro to Forecasting	3
		OR	
ECN	486	Sem in Adv. Econometrics	
		OR	
ECN	415	Math for Econ II	
		Non-Departmental Elective from supporting area	3
PHL		Philosophy Elective (Ethics)	3
		Non-Departmental Elective	3
		Free Elective	3

Senior Sem. 2

		Fine Arts Elective	3
ECN		Economics Elective	3
		Non-Departmental Elective	3
		Free Electives (2)	6

NOTE: The above-suggested sequence of courses reflects a typical program of study. The sequence may be modified to accommodate student needs and course scheduling arrangements. All course substitutions must be made in consultation with the student's faculty advisor and require the prior approval of the economics department chair.

Required: ECN 101, 102, 201, 202, 214, 314, 315, and either 409 or 415 or 486, and 12 credit hours of upper-division economics electives. Also required: THL 376, one year of calculus (currently satisfied by MTH 109/110 or MTH 131/132), MTH 217, and nine credit hours from a supporting area of quantitative electives from within or across the departments of math, computer science, engineering-physics-systems, accountancy, finance, or management. Course selection to fulfill this supporting area requires approval of the economics department chair.

* A minor or double major in math, computer science, EPS, accountancy, finance, or management would automatically fulfill the supporting area requirement.

The Minor

Required Courses

ECN	101	Principles of Economics: Micro
ECN	102	Principles of Economics: Macro

One (1) of the following:

ECN	201	Microeconomic Analysis
ECN	202	Macroeconomic Analysis

Any three (3) upper-division economics courses.

The total credit hours for the minor are 18 credits.

The Courses

ECN 101 Principles of Economics: Micro

I SEMESTER, 3 CREDITS (Social Science Core)

This course explains the economic behavior of individuals and firms in a market economy. Consideration is given to consumer and producer choice under various market structures and to the theoretical and actual distribution of income.

ECN 102 Principles of Economics: Macro

I SEMESTER, 3 CREDITS (Social Science Core)

A model of the aggregate economy is developed to determine the level of output, income, prices, and employment. The international sector is incorporated into the model reflecting the importance of international trade in today's economies. The role of fiscal and monetary policies in economic outcomes is examined and evaluated.

ECN 201 Microeconomic Analysis

I SEMESTER, 3 CREDITS

This course studies consumer behavior and the theory of the firm. Pricing in the factor and product markets under varying degrees of competition and partial vs. general equilibrium conditions are discussed. This serves as an introduction to welfare economics. *Prerequisites:* ECN 101 and either MTH 108, 109, or 131.

ECN 202 Macroeconomic Analysis

I SEMESTER, 3 CREDITS

This course provides a detailed study of the macroeconomy. Topics include the determination of income, output, price level, monetary and fiscal policy, unemployment, growth and productivity. The open economy is integrated into the course material in order to provide a comprehensive study. Attention is given to the expectations in economic outcomes and policy-making. *Prerequisite:* ECN 102.

ECN 214 Introduction to Econometrics with Computing Lab

I SEMESTER, 4 CREDITS

The course develops a set of tools that are used to access, analyze, and interpret economic data. Students are introduced to major economic databases, basic statistical techniques, and receive hands-on training in the use of current information technologies. *Prerequisites:* ECN 101 or 102, and MTH 217.

ECN 306 General Economic History

I SEMESTER, 3 CREDITS (Social Science Core)

This course traces the development of the modern econ-

omy from its pre-industrial origins to its contemporary global network of tight commercial and financial linkages. Particular attention is devoted to identifying and accounting for patterns in the broad economic movements of the past three centuries. *Prerequisite:* ECN 101 or 102.

ECN 307 American Economic History

I SEMESTER, 3 CREDITS

This course examines the structure and ideology of economic change in the United States from Colonial times to the present together with the dynamic development of its economic institutions. The approach is analytical rather than descriptive. Political, social, and cultural events are acknowledged for their influence on economic events and institutions. *Prerequisite:* ECN 101 or 102.

ECN 309 Development of Economic Thought

I SEMESTER, 3 CREDITS

The course surveys the development of economic thought and method from the Greek classical period to the present. It critically presents the works and ideas of both mainstream and non-mainstream economic writers with special emphasis on the evolution of the discipline since circa 1775. *Prerequisite:* ECN 101 or 102.

ECN 312 Managerial Economics

I SEMESTER, 3 CREDITS

This course applies economic analysis to the process and use of economic information to develop strategies that enhance the goals of the organization in a highly competitive economic environment. Emphasis is placed on analyzing choices by using the economist's set of tools in describing, analyzing, and understanding diverse problems faced by decision makers in an economic framework. *Prerequisite:* ECN 201.

ECN 314 Econometric Models

I SEMESTER, 3 CREDITS

The course extends the analysis of linear models and their applications to include the problems associated with both model specification and estimation methods in the context of single equation models. It also introduces students to the study of simultaneous equation econometric models. *Prerequisite:* ECN 214.

ECN 315 Mathematics for Economists I

I SEMESTER, 3 CREDITS

This course introduces students to the study of how principal mathematical techniques are applied to static and

comparative-static economic analysis. These techniques include differential calculus and matrix algebra. Emphasis is placed on the application of these mathematical tools to economic analysis. *Prerequisites:* ECN 201 and 202.

ECN 320 Labor Economics

I SEMESTER, 3 CREDITS

This course introduces students to the study of the economics of the labor market. Analysis of the demand for and supply of labor as well as the theories of wage determination are studied in detail. The economic effects of unions and governmental legislation on the operation of the labor market are considered. *Prerequisite:* ECN 101.

ECN 321 Labor-Management Relations

I SEMESTER, 3 CREDITS

This course studies the historical, legal, and institutional aspects of labor-management relations in the United States. The work environments of unionized and non-unionized organizations are contrasted. Labor-management relations systems of the major trading partners of the United States are examined, as are ethical issues facing unions and employers. Case studies are an integral part of this course. *Prerequisite:* ECN 101.

ECN 322 Collective Bargaining

I SEMESTER, 3 CREDITS

This course introduces the structure and process of bargaining. Focus is placed on the economic and behavioral theories of bargaining as well as the strategies and tactics utilized in negotiations and the consequences of a breakdown in negotiations. Selected leading issues are examined in depth. Students participate in simulated collective bargaining exercises and grievance arbitration cases. *Prerequisite:* ECN 101.

ECN 335 The Economics of Developing Nations

I SEMESTER, 3 CREDITS

This course surveys of theories and policies of developing nations. Attention is given to geography, natural and human resources, the rural and industrial sectors, governmental administration and planning, monetary and fiscal policies, foreign trade and aid, balance of payments, sustainable development (environment and development), integration, and prospects of further development. *Same as BLS 335. Prerequisite:* ECN 101 or 102.

ECN 336 Transition Economies

I SEMESTER, 3 CREDITS

This course studies the particular economic and social problems encountered by countries as they make the transition from centrally planned economies to market economies. Some of the issues discussed are poverty and income distribution, economic restructuring and foreign trade, stabilization, growth and inflation, and development of capitalist institutions. *Prerequisites:* ECN 101 and 102.

ECN 337 Comparative Economic Systems

I SEMESTER, 3 CREDITS

This course analyzes and compares how different economic systems function with special emphasis on capitalism. The organization of economic activity is studied in light of general economic goals of the society. Consideration is given to the role of financial institutions, industrial organization, agriculture, trade, and the allocation of resources. *Prerequisite:* ECN 101 or 102.

ECN 338 Consumer Economics

I SEMESTER, 3 CREDITS (Social Science Core)

This course analyzes the influence of contemporary consumerism on economic concepts, institutions, and activities. The contribution of the modern consumer movement to economic theory and market performance is discussed. This appraisal is applied to various market situations. *Prerequisite:* ECN 101 or 102.

ECN 341 Urban Economics

I SEMESTER, 3 CREDITS

The purpose of this course is to present an economic view of the structure, functions, and contemporary problems of urban areas. The course is policy-oriented and uses the tools of microeconomics for analytical purposes. The economics of urban problems such as poverty, homelessness, congestion, pollution, and crime are explored. *Prerequisite:* ECN 101.

ECN 342 Environmental and Natural Resource Economics

I SEMESTER, 3 CREDITS

This course studies the economic principles related to renewable and non-renewable natural resource use. Attention is given to issues concerning pollution abatement policies, common property resources, recycling, global pollutants, and the adequacy of natural resources to meet future demands. *Prerequisite:* ECN 101.

ECN 343 Health Economics

I SEMESTER, 3 CREDITS (Social Science Core)

This course studies the allocation of scarce economic resources within the health care market. The size and contribution of the health care sector, the role of health insurance, the organization of health institutions, the production and cost of health care, and health care reform are studied in detail. *Prerequisites:* ECN 101 and 102.

ECN 344 Economics of Poverty and Discrimination

I SEMESTER, 3 CREDITS (Social Science Core)

This course examines the underlying causes of poverty and discrimination in the United States. It provides students with the necessary skills to understand the societal consequences of these problems and to evaluate alternative policy proposals. *Prerequisite:* ECN 101 or 102.

ECN 351 Industrial Organization

I SEMESTER, 3 CREDITS

This course analyzes theoretical evaluations of market structure with regard to the performance and conduct of firms. Special attention is given to regulation and other public policy issues such as antitrust policy. The emphasis is on the application of theory to real-world markets. *Prerequisite:* ECN 101.

ECN 352 Business, Government, and Society

I SEMESTER, 3 CREDITS (Social Science Core)

This course examines the economic relationships among business, government, and consumers within the contemporary legal framework. Using the case method, laws relating to business mergers, pricing, and restrictive practices are examined. While the application of microeconomic theory is the principal focus, emphasis is also given to laws relating to consumer well-being in both the labor and product markets. *Prerequisite:* ECN 101.

ECN 356 Economics Internship

I SEMESTER, 3 CREDITS

This experience offers credit to students in department-sponsored internships in for-profit and non-profit business organizations and governmental agencies. Academic assignments specified in the economics internship contract must be completed. Offered on a pass-fail basis only. *Prerequisite:* Junior and senior economics majors only. *Prior written approval of the economics department chair is required.*

ECN 360 Money and Banking

I SEMESTER, 3 CREDITS

This course studies interest rates, exchange rates, the supply of money, the management of financial intermediaries, and the role of the central bank in achieving price stability. Emphasis is placed on money creation, financial innovation, and banking regulation. Federal Reserve tools and policies are studied within a framework of contemporary macroeconomic theory, including international trade and payments. *Prerequisite:* ECN 202.

ECN 365 International Trade Theory and Policy

I SEMESTER, 3 CREDITS

This course provides a solid grounding in the economics of international trade. Students will learn international trade theory and how to use it to analyze public policy questions. Topics include the case for free trade, the arguments of tariff protection, and effects of trade and protectionist policies on resource allocation, income distribution, and economic growth. *Prerequisite:* ECN 201.

ECN 366 International Monetary Economics

I SEMESTER, 3 CREDITS

The course provides an introduction to the current international monetary system. Emphasis is given to theories of exchange rates and their dynamics. The limitations imposed on monetary and fiscal policy by international capital flows will be covered thoroughly. Examines current topics in reform of the exchange rate system, monetary integration, and multi-national coordination. *Prerequisite:* ECN 202.

ECN 380 Law and Economics

I SEMESTER, 3 CREDITS

This course presents an economic evaluation of the law. It examines the consequences of judicial decisions on the process of resource allocation and evaluates the legal system in terms of its ability to facilitate and achieve economic efficiency. The necessary framework for understanding the evolution of the law and the comparison of alternative legal systems is developed. *Prerequisite:* ECN 101.

ECN 409 Economic Forecasting

I SEMESTER, 3 CREDITS

This course presents a study of econometric techniques, regression models, and time-series analysis for the purposes of forecasting and policy evaluation. Statistical measures used to determine the overall goodness-of-fit of

these models and to test the reliability of a forecast are introduced. Forecasting is used to compare the effects of alternative economic policies. *Prerequisites:* ECN 202 and 314.

ECN 415 Mathematics for Economists II

I SEMESTER, 3 CREDITS

This course presents a study of the principal mathematical techniques used in dynamic economic analysis. Integral calculus, differential equations, difference equations, linear programming, nonlinear programming, and game theory will be applied to economic analysis. *Prerequisite:* ECN 315.

ECN 425 Public Finance

I SEMESTER, 3 CREDITS

This course presents an analysis of the economic problems faced by public decision makers and the economic tools that are available to them. The course will cover such topics as welfare economics, benefit-cost analysis, public choice, taxation, income redistribution, and the relationship between the budget and the setting of national priorities. *Prerequisite:* ECN 201.

ECN 438 Introduction to the Theory of Economic Growth

I SEMESTER, 3 CREDITS

This course presents an analysis of the factors that cause an economy to grow. Attention will be given primarily to one- and two-sector models of economic growth. Some emphasis will be put on the effects of technical progress on growth and optimality aspects of growth models. *Prerequisite:* ECN 202.

ECN 440 Economics of Globalization

I SEMESTER, 3 CREDITS

This lecture-seminar examines constitutive components of 20th-century global economic integration: trade liberalization, financial globalization, the knowledge economy and market failures. By the end of the semester, students are expected to be conversant with the descriptive and analytical dimensions of globalization using neoclassical economic theory, including the contributions of leading scholars in the field. *Prerequisites:* ECN 201 and ECN 202.

ECN 449 Financial Economics

I SEMESTER, 3 CREDITS

This course covers issues critical to the allocation of savings and examines questions related to the efficiency of

financial markets and asset pricing. Individual saver/investor portfolio formation and protection will be thoroughly discussed. Basic principles of financial economics, savings instruments, markets, and intermediaries will be covered as needed. *Prerequisite:* ECN 202.

ECN 484 Seminar in Contemporary Economic Thought

I SEMESTER, 3 CREDITS

This course presents a critical examination of the success and failure of economic theory and policy. It also includes an introduction to emerging economic thinking. *Prerequisites:* ECN 201 and ECN 202.

ECN 485 Seminar in Contemporary Economic Issues

I SEMESTER, 3 CREDITS

This course presents an in-depth survey of selected economic issues. Students will be expected to perform independent research. *Prerequisites:* ECN 201 and 202.

ECN 486 Seminar in Advanced Econometrics

I SEMESTER, 3 CREDITS

This course studies advanced topics in econometrics. Every seminar will include a rigorous discussion of the basic econometric theory needed to develop and analyze models of economic behavior. The student will be expected to write and present a major research paper using statistical analysis. *Prerequisites:* ECN 314 and 315.

ECN 490 Readings and Research

I SEMESTER, 3 CREDITS

This course is open primarily to senior economics majors who would select both the topic and the instructor. Permission to register for this course should be obtained from the instructor whose guidance is sought. *Prerequisites:* ECN 201 and 202 and prior written approval of chairperson.

Education

The Program

Providence College offers three education programs on the undergraduate level: a major in elementary/special education, a secondary teacher's preparation program, and a music education program.

All teacher education programs offered by the College have been approved by the Rhode Island Department of Elementary and Secondary Education and the Interstate Certification Compact. Some individual states may not offer separate certification in the area of history and instead only issue certificates in social studies; students completing programs in history secondary education may not be eligible for certification in history in those states through the process of reciprocity.

Education majors are required to have and maintain a grade point average of 2.50. In addition, students must meet specified criteria at four points in the program: admissions, monitoring, readiness to student teach, and approval for licensure. These criteria include successful participation in a portfolio review. For a complete listing of the criteria at each point in the assessment system, refer to the Department of Education's Student Handbook. Finally, students must achieve required scores on standardized preprofessional and professional tests of content knowledge and pedagogy.

Teacher Preparation Licensure

Three hundred clock hours are required for secondary education students in biology, chemistry, English, history, mathematics, physics, social studies, Italian, French, and Spanish; and 400 clock hours for elementary/special education and music education teacher candidates.

Education Diversity Requirements

In helping to prepare future teachers to work effectively with students and families from all cultures and backgrounds, education majors must fulfill the following diversity requirements:

1. Completion of at least one course from an approved list of diversity electives; the diversity elective may also satisfy a Core Curriculum requirement, meet a minor requirement, or fill a free elective slot;

2. Completion of at least one practicum experience in an urban setting;

3. Demonstration of the ability to prepare and implement lessons that include effective strategies for working with students from diverse cultures and backgrounds.

Music Education

For students interested in the music/music education program, please refer to the Department of Music section of this catalog.

Education: Elementary/Special

Contact Information

Phone: 401.865.2121

Fax: 401.865.2057

Location: Harkins Hall 322

The Faculty

Professors

Jane P. Callahan, Ph.D., *Chairperson*

Lynne B. Ryan, Ph.D.

Associate Professors

Deborah P. Goessling, Ed.D.

Laurie L. Grupp, Ph.D.

Laura Boynton Hauerwas, Ph.D.

Susan F. Skawinski, Ed.D.

Assistant Professors

Jeri G. Gillin, Ed.D.

Catherine L. Keating, Ph.D.

Peter W. Morgan, Ed.D.

Zachary S. Rossetti, Ph.D.

Marcy B. Zipke, Ph.D.

Elementary/Special Education

The elementary/special education major is a combined program that emphasizes preparation in both areas. The program allows students to approach the field of education at the elementary level with an appreciation of individual differences and with an understanding of ways to meet those differences within the elementary school organization. Upon completion of the program, students are eligible for certification as both an elementary education and special education teacher in Rhode Island and states with reciprocal agreements.

Although students may be accepted to the College as elementary/special education majors, *this is a provisional acceptance to the program*. Formal admission will take place no later than the end of the sophomore year. Minimally, this process will require students to have and maintain a grade point average of at least 2.5, earn a "C" or better in all education classes, attend regular portfolio seminars, participate in a portfolio review process, meet predetermined scores on the SAT or a standardized preprofessional exam, and demonstrate appropriate communication skills.

Students are required to follow a prescribed program that includes integrated course work and four field experi-

ences in local elementary schools. The program culminates with a full semester of student teaching: a minimum of eight weeks with an elementary teacher and a minimum of eight weeks with an elementary special education teacher. The program also includes 18-21 hours of either free or non-departmental electives. Students are encouraged to pursue a minor.

Suggested Sequence

Freshman

DWC	101	Development of Western Civilization
DWC	102	Development of Western Civilization
PSY	100	Introduction to Psychology**
EDU	125	Communications Disorders/Dev in Children
EDU	301	Foundations of Education
MTH		Math Elective
		Fine Arts Elective
ENG	101	English 101 (or Proficiency) or Free Elective

Sophomore

DWC	201	Development of Western Civilization
DWC	202	Development of Western Civilization
EDU	221	Intro and Characteristics of Individuals with Special Needs
EDU	231	Methods & Materials for Teaching Reading (Literacy I)
EDU	231L	Methods & Materials for Teaching Reading—Field Experience (Literacy I Lab)
EDU	285	Strategies in Classroom Management
PSY	312	Child Psychology**
NSC (2)		Nat. Science Requirements (2 courses)*

Junior

EDU	270	Teaching Science and Math in Elem. Sch.
EDU	270L	Teaching Science and Mathematics – Field Experience
EDU	322	Collaboration: Home/School/Community
EDU	331	Teaching Language Arts & Social Studies in Elementary School (Literacy II)
EDU	331L	Teaching Language Arts & Social Studies - Field Experience (Literacy II Lab)
EDU	332	Art, Music, Health, and Physical Education in the Elementary School
PHL		Philosophy Elective (Ethics)
THL		Theology Elective
		Non-Departmental Electives (3 courses)
		Free Elective

Senior

EDU 390	(Fall Semester) Assessment of Children's Individual Differences
EDU 418	(Fall Semester) Assessment & Curriculum Methodologies of Individuals with Mild/Mod Disabilities at Elem Level Reading
EDU 418L	Special Education Field Experience
PHL	Philosophy Elective
THL	Theology Elective
EDU 451	(Spring Semester) Student Teaching Elem. Ed
EDU 452	(Spring Semester) Student Teaching Spec Ed Free Electives

*Students in elementary/special education are required to take at least one semester of a biological science and one semester of an earth/physical science.

**Fulfills social science requirements.

The Courses

NOTE: For a list of additional education courses, please refer to the Secondary Education section.

EDU 125 Introduction to Communication Disorders and Development in Children

I SEMESTER, 3 CREDITS

The development of speech and language and the impact of language delays, differences, and disorders on communication and literacy in and out of the classroom will be discussed. Issues surrounding English language learning, classroom discourse, and ACC will be addressed. Instructional strategies, accommodations, and modifications of lessons will be considered.

EDU 221 Intro and Characteristics of Individuals with Special Needs

I SEMESTER, 3 CREDITS

This course is an introduction to students with specialized instructional needs. It begins with an overview of the laws that provide students with disabilities with a free and appropriate public education. The diverse characteristics and needs of students eligible for IDEA 2004, ADA provisions, and 504 accommodation plans will be discussed. School observations and interviews with teachers and specialists are required.

EDU 231 Literacy I: Methods and Materials for Teaching Reading

I SEMESTER, 3 CREDITS

This course provides an understanding of the developmental stages in reading and writing in the primary grades. Students learn about instructional approaches and materials used in teaching literacy and apply this knowledge as they develop literacy-related lessons. Students also learn about assessments used to support instruction. A field experience in an elementary school is required. (See EDU 231L.)

EDU 231L Literacy I: Methods and Materials for Teaching Reading Field Experience

I SEMESTER, 1 CREDIT

This field experience is taken concurrently with EDU 231.

EDU 270 Teaching Science & Mathematics in the Elementary School

I SEMESTER, 3 CREDITS

This course is designed to expose students to a variety of curriculum models and instructional strategies related to teaching science and mathematics in elementary school. Students will develop science and mathematics lessons reflecting national standards. Students will explore methods to meet diverse educational needs, ways to manage activity-based classrooms, and techniques of assessment. Field experience in an elementary school required. (See EDU 270L.)

EDU 270L Teaching Science & Mathematics Field Experience

I SEMESTER, 1 CREDIT

This field experience is taken concurrently with EDU 270.

EDU 285 Strategies for Classroom Management

I SEMESTER, 3 CREDITS

This course is designed to assist preservice teachers in developing strategies for managing and integrating the physical, academic, social, and behavioral variables of the classroom. Techniques for individual and group management based upon a variety of theories will be explored. Appropriate application of strategies for the diverse student population currently represented in our schools will be included.

EDU 301 Foundations of Education

I SEMESTER, 3 CREDITS

The historical, philosophical, and social influences that have contributed, through education, to American traditions, ideas, institutions, and the cultural development of our way of life. Service-learning component may be required. Check with advisor for further information.

EDU 322 Collaboration: Home/School/Community

I SEMESTER, 3 CREDITS

This course is designed to provide students with knowledge about the special education system and its relationship to general education. It includes an overview of special education history and laws, as well as the emergence of inclusive education. An important focus of the course is to analyze strategies to improve communication and collaboration among families, school staff, and community resources.

EDU 331 Literacy II: Teaching Language Arts & Social Studies in the Elementary School

I SEMESTER, 3 CREDITS

This course is designed to expose students to current language arts and social studies theories and practices. Students will develop and implement integrated language arts and social studies lessons that incorporate literature and process writing and reflect national standards. Students will also explore methods of authentic assessment. A field experience in an elementary school is required. (See EDU 331L.)

EDU 331L Literacy II: Teaching Language Arts & Social Studies Field Experience

I SEMESTER, 1 CREDIT

This field experience is taken concurrently with EDU 331.

EDU 332 Art, Music, Health, and Physical Education in the Elementary School

I SEMESTER, 4 CREDITS

This course has been designed to familiarize the preservice elementary teacher with the basic techniques, curricula, and materials used in teaching music, art, literature, drama, physical education, and health to children from a developmental perspective. Integrating the arts into the regular elementary and special education curriculum will also be addressed.

EDU 390 Assessment of Children's Individual Differences

I SEMESTER, 3 CREDITS

This course is designed to provide a student with back-

ground information on the assessment of children and the special education process. Practical applications of observation, standardized norm-referenced tests, curriculum-based assessment, and educational report writing are emphasized.

EDU 418 Assessment & Curriculum Methodologies of Teaching Students with Mild/Moderate Disabilities at the Elementary Level

I SEMESTER, 3 CREDITS

This course is designed to assist teachers in developing skills and techniques for facilitating learning in children with disabilities. Techniques based on systematic teaching and an expanded understanding of the learning characteristics of the child with disabilities will be explored. See also EDU 418L. Prerequisites: EDU 270 and EDU 370.

EDU 418L Special Education Field Experience

I semester, 1 credit

This field experience is taken concurrently with EDU 418.

EDU 451 Student Teaching in the Elementary School

I SEMESTER, 6 CREDITS

Teaching on the elementary level under the joint supervision of a cooperating teacher and a College supervisor in the school systems of Rhode Island or neighboring Massachusetts communities. Weekly seminars are required. Prerequisites: EDU 231, EDU 270, and EDU 331.

EDU 452 Student Teaching in Elementary/Special Education

I SEMESTER, 6 CREDITS

Teaching special education under the joint supervision of a cooperating teacher and a College supervisor in the school systems of Rhode Island or neighboring Massachusetts communities. Weekly seminars are required. Prerequisites: EDU 390 and EDU 418.

EDU 470 Selected Topics in Education

I SEMESTER, 3 CREDITS

In this elective course, special topics in education will be offered that are not covered in depth in existing courses. The courses will reflect current issues, innovations, debates, and/or controversies within the field of education. Topics may include those being considered for new courses as well as those permitting faculty to develop areas of individual and/or research interests.

Education: Secondary

Contact Information

Phone: 401.865.2121

Fax: 401.865.2057

Location: Harkins Hall 322

The Faculty

Associate Professors

Thomas F. Flaherty, Ph.D.

Brian M. McCadden, Ph.D.

Carmen A. Rolon, Ed.D.

Sally J. Thibodeau, Ph.D., *Program Director*

Secondary Education

Preparation for a teaching career requires: (1) a background of general education, (2) specialization in the subject area, and (3) study in the field of education. The subject areas in which students may be certified include:

- Biology
- Chemistry
- English
- French
- History
- Italian
- Mathematics
- Physics
- Social Studies
- Spanish

Students preparing for the teaching profession must complete a subject area major in addition to the teacher preparation program. Please refer to the appropriate department or program sections of this catalog for the suggested sequence of courses for the subject areas listed above.

Prospective secondary education students must participate in a formal admissions process to the program either second semester of the sophomore year or first semester of the junior year. Minimally, this process will require students to have and maintain a quality point average of at least 2.50, earn a "C" or better in all education classes, meet the predetermined scores on a standardized preprofessional exam, attend required portfolio seminars, participate in a portfolio review process, and demonstrate appropriate communication skills.

A course program must be planned with the director of secondary education, preferably prior to registration for sophomore year. Minimum undergraduate preparation in the field of education consists of 31 semester hours in the following sequence:

			Credits
EDU	201	Educational Psychology	3
EDU	206	Principles of Secondary Education	3
EDU	206L	Principles of Secondary Education Field Experience	1
EDU	301	Foundations of Education	3
EDU	303	The Child with Special Needs in the Regular Classroom	3
EDU	303L	The Child with Special Needs in the Regular Classroom Field Experience	1
EDU	401	Educational Measurement	3
EDU	401L	Educational Measurement Field Experience	1
EDU	411, 412, 414, 415, or 416	Methods course in area of concentration	3
EDU	411L, 412L, 414L, 415L, or 416L	Methods Field Experience in area of concentration	1
EDU	450	Student Teaching in the Secondary School	9

The Courses

NOTE: For a list of additional education courses, please refer to the *Elementary/Special Education* section.

EDU 201 Educational Psychology

I SEMESTER, 3 CREDITS

This course is the study of those facts and principles of psychology that will assist the students in formulating and clarifying objectives as classroom teachers. It deals with such matters as cognitive development, motivation, retention, problem solving, and the social and emotional problems involved in personality integration.

EDU 206 Principles of Secondary Education

I SEMESTER, 3 CREDITS

This course considers the secondary school in its totality. Students are introduced to lesson and unit planning, national and state content standards, as well as to the importance of literacy across the secondary curriculum. A field experience in a secondary school is required. (See also EDU 206L.)

EDU 206L Principles of Secondary Education Field Experience

I SEMESTER, 1 CREDIT

A minimum 25-hour field experience is taken concurrently with EDU 206.

EDU 301 Foundations of Education

I SEMESTER, 3 CREDITS

The historical, philosophical, and social influences that have contributed, through education, to American traditions, ideas, institutions, and the cultural development of our way of life. Service-learning component may be required. Check with your advisor for further information.

EDU 303 The Child with Special Needs in the Regular Classroom

I SEMESTER, 3 CREDITS

This course is designed to provide prospective teachers with the skills, knowledge, and attitudes required to identify students with special needs and to work with support staff in meeting the students' needs within the general curriculum. It will focus on understanding the characteristics and needs of these students within a least restrictive environment. (See also EDU 303L.)

EDU 303L The Child with Special Needs in the Regular Classroom Field Experience

I SEMESTER, 1 CREDIT

A minimum 25-hour field experience is taken concurrently with EDU 303.

EDU 401 Educational Measurement

I SEMESTER, 3 CREDITS

This course is designed to introduce students to the theory and practice of cognitive assessment including the construction, application, and interpretation of standardized and teacher-made tests used to inform teaching and curriculum decision-making. Students also will examine alternative assessments including authentic and portfolio assessments. (See EDU 401L.)

EDU 401L Educational Measurement Field Experience

I SEMESTER, 1 CREDIT

A minimum 25-hour field experience is taken concurrently with EDU 401.

EDU 411 Teaching English in Secondary Schools

I SEMESTER, 3 CREDITS

Consideration will be given to the methods, procedures, and techniques found effective in the teaching of English on the secondary level. Attention will be given to the formulation of lesson plans and the use of micro teaching in the critique of the presentation of these lesson plans. (See also EDU 411L.)

EDU 411L Teaching English in Secondary Schools Field Experience

I SEMESTER, 1 CREDIT

A minimum 25 hour field experience is taken concurrently with EDU 411.

EDU 412 Teaching Science in Secondary Schools

I SEMESTER, 3 CREDITS

This course is designed to introduce prospective teachers to new curricula in science. The students will examine science standards and have an opportunity to develop and present a series of lessons based on these standards. Students also will develop a series of experiments to demonstrate basic scientific principles as preparation for actual classroom teaching.

EDU 412L Teaching Science in Secondary Schools Field Experience

I SEMESTER, 1 CREDIT

A minimum 25-hour field experience is taken concurrently with EDU 412.

EDU 414 Teaching Social Studies in Secondary Schools

I SEMESTER, 3 CREDITS

This course is designed to make students aware of the principles and methods of social studies instruction and current research in the field. (See also EDU 414L.)

EDU 414L Teaching Social Studies in Secondary Schools Field Experience

I SEMESTER, 1 CREDIT

A minimum 25-hour field experience is taken concurrently with EDU 414.

EDU 415 Teaching Modern Languages in Secondary Schools

I SEMESTER, 3 CREDITS

The purpose of this course is to develop more effective foreign language teaching through the examination of recent research in methodology and educational media. Laboratory experiences will be offered. (See also EDU 415L.)

EDU 415L Teaching Modern Languages in Secondary Schools Field Experience

I SEMESTER, 1 CREDIT

A minimum 25-hour field experience is taken concurrently with EDU 415.

EDU 416 Teaching Mathematics in Secondary Schools

I SEMESTER, 3 CREDITS

This course is designed to provide students with an understanding of teaching mathematics in a concrete fashion. NCTM standards will be reviewed and the students will use a variety of strategies and resources including technology to prepare materials and lessons. (See also EDU 416L.)

EDU 416L Teaching Mathematics in Secondary Schools Field Experience

I SEMESTER, 1 CREDIT

A minimum 25-hour field experience is taken concurrently with EDU 416.

EDU 450 Student Teaching in the Secondary School

I SEMESTER, 9 CREDITS

This course involves a semester of teaching in a secondary school under the joint supervision of a cooperating teacher and a College supervisor. Seminar meetings will be held. *Prerequisites:* EDU 206 and either EDU 411, EDU 412, EDU 414, EDU 415, or EDU 416.

EDU 471 Selected Topics in Education

I SEMESTER, 3 CREDITS

In this elective course, special topics in education will be offered that are not covered in depth in existing courses. The courses will reflect current issues, innovations, debates, and/or controversies within the field of education. Topics may include those being considered for new courses as well as those permitting faculty to develop areas of individual and/or research interests.

Engineering-Physics-Systems

Contact Information

Phone: 401.865.2164

Fax: 401.865.1438

Location: Sowa Hall 239

The Faculty

Professors

Louis H. Cadwell, Ph.D.

Stephen J. Mecca, Ph.D.

Assistant Professors

Robert G. LaMontagne, Ph.D.

Lynne M. Lawson, Ph.D., *Chairperson*

Theresa A. Moreau, Ph.D.

The Programs

The Department of Engineering-Physics-Systems offers undergraduate programs designed to prepare individuals for careers in applied science and engineering. Applied physics and multidisciplinary courses of study emphasizing systems science leading to the bachelor of science degree are available. The department has a combined-plan engineering program, which has affiliations with Columbia University and Washington University in St. Louis. For students who are interested in teaching physics at the high school level, a physics/secondary education track which leads to a bachelor of arts is also available.

Combined Plan Engineering Program

The combined-plan offers multiple degree opportunities for students desiring to enter the engineering profession. The most popular program is the 3-2 plan in which a student spends three years in a pre-engineering curriculum at Providence College where the humanities, science, and mathematics are blended to produce the kind of fundamental background needed for future problem solvers. The final two years of study are spent in an engineering concentration of the student's choice at one of our affiliate universities. Students successfully completing the combined-plan receive a degree from Providence College as well as the affiliate school which they attend. The diploma from Providence College is awarded at the end of the fifth year of study, when the student has completed his/her studies at the affiliate school. We recognize that our students form many valuable and important friendships during their years at Providence College. To honor these relationships, combined-plan students are invited to participate in the numerous pre-graduation activities with their entering year classmates and to participate in their graduation.

Students interested in engineering can also complete the program on a 4-2 schedule, spending 4 years at Providence College and 2 years at the affiliate school. This will also result in a B.S. in engineering. The concentrations available include: aerospace, chemical, civil, electrical, and mechanical engineering. Special areas of study are available in environmental, biomedical, computer engineering, systems science, and other multidisciplinary engineering fields.

All engineering students follow the pre-engineering curriculum outlined on the next page. Students planning to continue in some specialized areas of engineering such as chemical or biomedical engineering must include additional course work as prescribed by the affiliated university in the joint program. A "B" average, both overall and in the major, is the standard required for continuation in engineering.

Suggested Sequence: Engineering-Physics-Systems

			Credits
<i>Freshman Sem. 1</i>			
DWC	101	Devel of Western Civilization	5
MTH	131	Calc & Analytic Geometry I	3
ECN	101	Social Science Elective	3
		Free Elective	3
EPS	131	Intro to Engineering	1

Freshman Sem. 2

DWC	102	Devel of Western Civilization	5
MTH	132	Calc & Analytic Geometry II	3
		Social Science Elective	3
EPS	101	General Physics I (with lab)	4

Sophomore Sem. 1

DWC	201	Devel of Western Civilization	5
EPS	102	General Physics II (with lab)	4
MTH	223	Calculus III	3
		Theology Elective	3

Sophomore Sem. 2

DWC	202	Devel of Western Civilization	5
EPS	201	Intro Modern Physics (with lab)	4
MTH	304	Differential Equations	3
		Philosophy Elective	3
EPS	222	Elements of Systems Modeling	1

Junior Sem. 1

EPS	301	Mechanics	3
MTH	417	Topics in Applied Math	3
EPS	221	Scientific Programming	3
		Fine Arts Elective	3
CHM	121	Intro Chemistry I (with lab)	4

Junior Sem. 2

EPS	202	Electronics (with lab)	4
EPS	430	Thermodynamics	3
THL		Theology Elective	3
PHL		Philosophy Elective (Ethics)	3
CHM	122	Intro Chemistry II (with lab)	4

Senior

Senior and subsequent year courses depend on a student's choice of engineering concentration and program.

NOTE: The above sequence of courses reflects a typical program of study and is subject to change.

Applied Physics Program

The Department of Engineering-Physics-Systems offers a cross-disciplinary program in applied physics that combines the traditional physics program with courses in systems science. The program builds skills in problem solving, planning, and technical management while preparing students for a variety of career and/or graduate study options. It is founded on a humanities and technical core curriculum similar to the combined-plan engineering program. Physics, chemistry, mathematics, and computational science form the technical core. The final four semesters provide the courses that are specific to the concentration. The following is a typical sequence of courses.

Suggested Sequence: Applied Physics

			Credits
<i>Freshman Sem. 1</i>			
DWC	101	Devel of Western Civilization	5
MTH	131	Calc & Analytic Geometry I	3
EPS	131	Intro to Engineering	1
		Free Electives (2)	6

Freshman Sem. 2

DWC	102	Devel of Western Civilization	5
MTH	132	Calc & Analytic Geometry II	3
EPS	101	General Physics I w/Lab	4
		Social Science Elective	3

Sophomore Sem. 1

DWC	201	Devel of Western Civilization	5
EPS	102	General Physics II (with lab)	4
MTH	223	Calculus III	3
THL		Theology Elective	3

Sophomore Sem. 2

DWC	202	Devel of Western Civilization	5
EPS	201	Intro Modern Physics (with lab)	4
MTH	304	Differential Equations	3
EPS	222	Elements of Systems Modeling	1
PHL		Philosophy Elective	3

Junior Sem. 1

EPS	301	Mechanics	3
MTH	417	Topics in Applied Math	3
CHM	121	Intro Chemistry I (with lab)	4
EPS	221	Scientific Programming	3
		Fine Arts Elective	3

Junior Sem. 2

EPS	202	Electronics (with lab)	4
EPS	430	Thermodynamics	3
CHM	122	Intro Chemistry II (with lab)	4
THL		Theology Elective	3
		Free Elective	3

Senior Sem. 1

EPS	302	Electromagnetism	3
EPS	303	Systems Approach Problem Solv	3
EPS	495/450	Research or Internship	3
PHL		Philosophy Elective (Ethics)	3
		Free Elective	3

Senior Sem. 2

EPS	448	Applied Quantum Physics	3
EPS	496/450	Research or Internship	3
		Social Science Elective	3
		Free Electives (2)	6

NOTE: The above sequence of courses reflects a typical applied physics program of study and is subject to change.

Physics/Secondary Education (B.A.)

Students interested in teaching at the high school level may prepare by following our physics/secondary education track. Students completing this track of study receive a bachelor of arts in physics with an emphasis in secondary education. The course of study has been carefully crafted to include the courses required for secondary education certification as well as a solid base of knowledge in physics. A student following this course of study would be well prepared to teach physics at the secondary level.

Suggested Sequence: Physics/Secondary Education (B.A.)

<i>Freshman Sem. 1</i>			<i>Credits</i>
DWC	101	Devel of Western Civilization	5
MTH	131	Calc and Analytic Geometry I	3
EPS	131	Intro to Engineering	1
		Social Science Elective	3
PHL		Philosophy Elective	3

Freshman Sem. 2

DWC	102	Devel of Western Civilization	5
MTH	132	Calc & Analytic Geometry II	3
EPS	101	General Physics I (with lab)	4
		Social Science Elective	3

Sophomore Sem. 1

DWC	201	Devel of Western Civilization	5
EPS	102	General Physics II (with lab)	4
MTH	223	Calculus III	3
EDU	201	Educational Psychology	3

Sophomore Sem. 2

DWC	202	Devel of Western Civilization	5
EPS	201	Intro to Modern Physics (with lab)	4
MTH	304	Differential Equation	3
EPS	222	Elements of Systems Modeling	1
EDU	206	Principles of Secondary Ed	3
EDU	206L	Principles of Secondary Ed Lab	1

Junior Sem. 1

EPS	301	Mechanics	3
MTH	417	Math of Science	3
CHM	121	Intro to Chemistry I (with lab)	4
EPS	221	Scientific Programming	3
EDU	401	Educational Measurement	3
EDU	401L	Educational Measurement (with lab)	1

Junior Sem. 2

EPS	202	Electronics (with lab)	4
CHM	122	Intro Chemistry II (with lab)	4
EPS	430	Thermodynamics	3
		Theology Elective	3
EDU	303	Child w Spec Needs in Reg Class	3
EDU	303L	Child w Spec Needs in Reg Class Lab	1

Senior Sem. 1

EPS	303	Systems Approach Problem Solving	3
PHL		Philosophy Elective (Ethics)	3
THL		Theology Elective	3
		Fine Arts Elective	3
EDU	412	Teach Science in Sec Schools	3
EDU	412L	Teach Science in Sec Schools Field Exp.	1

Senior Sem. 2

EDU	450	Student Teach in Sec School	9
		Free Elective	3
EDU	301	Foundations of Education	3

The Minors

Systems Science

Required Courses

- EPS 115 Concepts of Systems Science, 3 credits
 EPS 222 Elements of Systems Modeling, 1 credit
 EPS 303 Systems Approach to Complex Problem Solving, 3 credits

Any three (3) credit course offered in computer programming (from approved list)

Any three (3) courses totaling nine (9) credits from those listed under Engineering-Physics-Systems

Applied Physics

Required Courses

- EPS 101/102 General Physics I and II, 8 credits
 EPS 201 Modern Physics, 4 credits
 Two additional courses at 200 level or higher

The Courses**EPS 101 General Physics I**

I SEMESTER, 4 CREDITS (Natural Science Group I Core)

Introductory physics intended for physics, engineering, biology, chemistry, and mathematics majors. EPS 101 includes mechanics, waves, and heat. Calculus is used. (Lectures 3 hours, laboratory 3 hours.)

EPS 102 General Physics II

I SEMESTER, 4 CREDITS (Natural Science Group II Core*)

A continuation of EPS 101; includes electricity, magnetism, optics, and an introduction to relativity. Calculus is used. (Lectures 3 hours, laboratory 3 hours.) *Prerequisite:* EPS 101.

* See page 46 for specific policies related to the Natural Science Core requirement.

EPS 105 Conceptual Physics

I SEMESTER, 3 CREDITS (Natural Science Group I Core)

A course specifically designed for non-science majors. Topics included are: the classical ideas of motion as exemplified by Newton's Laws, the conservation theorems of energy and momentum and their application, the ideas of 20th-century physics, and selected subjects which relate to current concerns in everyday life.

EPS 115 Concepts of Systems Science

I SEMESTER, 3 CREDITS (Natural Science Group I Core)

A course specifically designed for non-science majors. The course introduces the concept of a system and looks at the properties and features that all systems have in

common. General systems principles will be illustrated by specific examples from natural systems: life cycles, entropy, system environments, feedback, and control. The morphology of models and their use will be emphasized.

EPS 117 Astronomy

I SEMESTER, 3 CREDITS (Natural Science Group I Core)

An introduction to the principles of astronomy for non-science majors. Topics to be covered include the history of the science and methods of study, the study of stars and galaxies, and a general survey of cosmological models. Recent discoveries such as background black-body radiation, pulsars, and quasars, as well as the implications of general relativity, will be discussed qualitatively.

EPS 118 Introduction to Meteorology

I SEMESTER, 3 CREDITS (Natural Science Group I Core)

Intended for non-science majors. The student will use actual data and perform in-class experiments to form a link between the empirical and theoretical aspects of the study of weather in order to appreciate how meteorology is a natural extension of the methods of inquiry used in physics. Numerical work is done, but the primary approach to the course material is conceptual.

EPS 120 The Science of Sound and Music

I SEMESTER, 3 CREDITS (Natural Science Group I Core)

For non-science majors with an interest in the scientific underpinnings of music and sound, through hands-on workshops, this course conceptually treats sound production, propagation, and sensing and topics including: pitch, loudness, timbre, scales, intervals, and performance spaces. Music knowledge is a plus.

EPS 125 How Things Work

I SEMESTER, 3 CREDITS (Natural Science Group I Core)

In this course, we will attempt to understand the workings of common technical devices in terms of simply physical principles. Examples range from bicycles to rockets, lights to lasers, radios to CDs, and solar panels to electrical power plants. No mathematics beyond algebra and trigonometry will be assumed.

EPS 131 Introduction to Engineering

I SEMESTER, 1 CREDIT

An introduction to the process and practice of engineering. Topics included are: the history of engineering, engineering design, optimization and mathematics in engineering, fields of engineering, the engineer and soci-

ety, contemporary opportunities, and challenges. The class will meet one hour per week.

EPS 201 Introductory Modern Physics

I SEMESTER, 4 CREDITS

Principles of special relativity and quantum physics; application to atomic, nuclear, molecular, solid state, and elementary particle physics. (Lectures 3 hours, laboratory 3 hours.) *Prerequisite:* EPS 102.

EPS 202 Electronic Devices

I SEMESTER, 4 CREDITS

An introduction to the principles of operation of the basic components of electronic devices. Included: circuit problems, models, integrated circuits, analog and digital systems, complex analysis, equivalent circuits. (Lectures 3 hours, laboratory 3 hours.)

EPS 221 Scientific Programming

I SEMESTER, 3 CREDITS

This course treats the structure and vocabulary of programming languages such as C, Fortran, or JAVA and their application in science/engineering problems. Input/output, control and branching, iteration, arrays and subscripts, file processing, and subprogramming will be treated. Standard modular/structured approaches will be emphasized. The course is intended for science and engineering majors.

EPS 222 Elements of Systems Modeling

I SEMESTER, 1 CREDIT

This course treats the concept of a system model and includes a basic introduction to Monte Carlo simulation and to dynamic representations such as Industrial Dynamics methods.

EPS 301 Mechanics

I SEMESTER, 3 CREDITS

This course examines vector algebra and vector calculus, statics, dynamics of particles, central force motion, oscillations, dynamics of rigid bodies, Lagrange's equations, and provides an introduction to Hamiltonian mechanics. *Prerequisite:* EPS 101.

EPS 302 Electromagnetism

I SEMESTER, 3 CREDITS

Basic electromagnetic field theory, charges in fields, radiation from charges, electrodynamics of continuous media, transmission of electromagnetic waves through materials.

EPS 303 Systems Approach to Complex Problem Solving

I SEMESTER, 3 CREDITS

Philosophy and techniques for defining problems, generating alternative solutions, and evaluating solutions for problems which require a multidisciplinary study will be discussed. Topics to be included: defining objectives, analysis of functions to be performed, enhancing creativity, the structure of systems, cost and effectiveness, and project management. *Prerequisite:* EPS 222.

EPS 430 Thermodynamics

I SEMESTER, 3 CREDITS

The course investigates the transfer of energy in complex objects. The tools employed will be mathematical modeling, statistics, the use of tables, differential equations, and computer programs. Emphasis will be placed on entropy and the limits it places on the performance of physical devices. *Prerequisite:* EPS 102.

EPS 448 Applied Quantum Physics

I SEMESTER, 3 CREDITS

The course examines the physical concepts governing the atomic and subatomic domain of matter. How these concepts manifest themselves in the mathematics of quantum mechanics and how they are used to investigate various physical states of matter will be examined. Emphasis will be placed on solutions to Schrödinger's equation. *Prerequisite:* EPS 201.

EPS 450 Internship

I SEMESTER, 3 CREDITS

This course is available to seniors who wish to gain experience in an industrial/company setting. Students will independently explore the practical applications of physical principles learned in the classroom.

EPS 495 - 496 Research

I SEMESTER EACH, 3 CREDITS

An original research problem which demands a thorough search of the literature and an intensive laboratory and/or theoretical investigation.