P.O. B 1002
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TABLE OF CONTENTS

Index

While Millersville University recognizes excellence in teaching as its reason for being, it also undertakes to open avenues for personal, social and cultural growth essential to the development of an educated and productive person, including development of the capacity for leadership and decisionmaking in order to make the fullest possible contribution to society. It will foster the examination, development and understanding of personal values and appreciation of the values of others.

The University also accepts its responsibility to provide opportunities for research, artistic and scholarly effort, and other creative endeavors in a manner consistent with its primary mission as a teaching institution. Additionally, the University accepts its responsibility to serve society by acting as an intellectual and cultural resource to the regional community.

To achieve this mission, the Millersville University community pledges itself to academic freedom and encourages imagination and curiosity, unfettered discourse, the exchange of divergent and controversial opinion, multicultural awareness and understanding within an environment of civility, mutual respect and cooperation.

CURRICULUM AND PROGRAMS

Millersville offers 51 bachelor's and three associate, degree programs in the arts and sciences, business, industrial technology and education, most of which offer many options and choices to students. All Millersville undergraduate degree programs include a general education component designed to develop student communication skills and critical thinking abilities as well as provide a broad foundation in the liberal arts, humanities, fine arts, and natural and social sciences.

Millersville also offers master's degrees in 23 programs in the arts and sciences and education, as well as selected certification programs.

A number of special educational opportunities are provided, including honors programs, independent study, field experiences, study at other institutions and abroad, and developmental course work.

Millersville University's faculty, staff and services reflect the University's concern for student growth and development. There are approximately 312 full-time faculty members available to advise and counsel students on academic and career-related matters. There are also counseling, career planning and placement, and tutorial services, as well as services for nontraditional students. A wide range of cocurricular and extracurricular activities and cultural events are offered.

Students may be admitted to Millersville University in a variety of ways depending on their goals. Most students wish to work on an undergraduate degree. Others may simply wish to take college-level courses for self enrichment or career development. Some students already holding a bachelor's degree may wish to pursue a second undergraduate degree. For more information on any of Millersville's undergraduate admission programs, contact the Office of Admissions in Lyle Hall: (800) MU-ADMIT; (717) 872-3371 or visit the MU website at: www.millersville.edu.

GENERAL ADMISSION POLICIES FOR ALL APPLICANTS TO UNDERGRADUATE DEGREE PROGRAMS

QUALIFYING FOR ADMISSION

Anyone who wishes to be considered for admission to Millersville University must be a graduate of an approved secondary school

PART-TIME STUDENTS

Full and part-time degree-seeking applicants must meet the same admission requirements.

SPECIAL ADMISSION PROGRAMS FOR DEGREE-SEEKING APPLICANTS

THE AIM FOR SUCCESS/ACT 101 PROGRAM

The AIM for Success/Act 101 Program is an academic enrichment program partially funded by the Higher Education Equal Opportunity Act (Act 101). Students are admitted on the basis of their demonstrated potential, motivation, and commitment to their college success and must meet educational and economic guidelines. The program provides placement testing, developmental instruction, academic advisement, counseling and academic support services. To facilitate transition into the University, students begin their studies in the summer before their freshman year.

TRANSFER APPLICANTS

Anyone who has completed a minimum of 12 transferable credits of course work at another accredited institution with an overall academic average of 2.0 or higher may be considered for admission as a transfer student. Applicants must submit an official college transcript from each institution previously attended. Transfer applicants with fewer than 12 transferable credits must also submit a high school transcript and standardized test scores (SAT I or ACT).

A higher GPA and more transferrable credits are required to enter some majors.

Applicants with less than a 2.0 average may be admitted on probation if they have been out of school for at least one semester and meet freshman admissions criteria.

Pennsylvania State System of Higher Education (PASSHE) Academic Passport. Millersville participates in this program that

OTHER RESTRICTED PROGRAMS

Millersville occasionally places more stringent admissions requirements on certain degree programs. Admission to the elementary education B.S.Ed. program is presently more selective than general admission to the University's other undergraduate programs. Some students interested in this program may be admitted to the University but denied admission to this specific program. Once their studies at Millersville are successfully under way, they may formally request to transfer into this program if they meet minimum departmental standards and if space is available.

ACADEMIC AMNESTY

Former Millersville University students applying for readmission following a minimum absence of five years since the end of their last semester are eligible to petition for academic amnesty if their cumulative grade point average (CGPA) was below 2.0 at departure. The petition must be in the form of a letter of appeal to the Academic Standards Committee, sent in care of the registrar's office.

In order to be eligible to petition for academic amnesty, the former student must complete an application for readmission to undergraduate degree status. If academic amnesty is granted, the calculation of the CGPA is restarted with the new matriculation semester.

Under academic amnesty, all previous course work and grades remain on the permanent record but are not included in the calculation of the MU CGPA after amnesty is granted. Students may use courses taken in the preamnesty period to fulfill general education requirements, only if a grade of C- or higher was earned in the course.

SECOND BACCALAUREATE DEGREE STUDENTS

Anyone with a bachelor's degree from a regionally accredited college or university may apply to earn a second bachelor's degree. All second-degree students must declare a major at the time they apply for admission.

NONDEGREE STUDENTS APPLYING FOR DEGREE-SEEKING STATUS

Individuals who are high school graduates or hold a General Education Development (GED) certificate may choose this alternative entry into a degree program without taking the SAT I or ACT tests. These students should first apply to the University as nondegree students. Upon completing 12 credits in at least two subject areas with an average of 2.0 or higher, they may then apply for degree-seeking status.

ADULT AND NONTRADITIONAL STUDENTS

Millersville University serves individuals who wish to pursue academic interests while also fulfilling work and/or family responsibilities. These courses and programs enable students to reach educational goals by attending college on a full-time or part-time basis through evening, day, off campus, online and weekend classes.

Applicants who meet criteria for regular admission will be admitted with the full privileges of degree students. Applicants who do not meet established admissions criteria may pursue a college degree on a part-time basis with provisional degree status. Provisional status ends when students successfully complete 12 credits at Millersville with a 2.0 average. Students who recently were asked to leave a college due to poor academic performance may not be admitted to these programs. New students may begin the admission process in the spring, fall or summer semesters. Application forms are submitted to the Millersville University Office of Admissions with a one-time application fee of $35 if applying electronically or $50 if using the paper application.

Admission opportunities also exist for the adult who did not have strong academic interests in high school or who tried college but did not continue due to motivational or personal reasons. The only required admission credential is a diploma and official transcript from an approved secondary school, a Commonwealth Secondary School Diploma or a General Education Development (GED) certificate. Official college transcripts are required if course work was completed at an institution previously attended.

Students who are granted admission will be assigned an academic adviser in their major field. Those admitted provisionally, or who applied for admission to elementary education and did not meet departmental admission requirements, will be listed as undeclared and temporarily assigned an undeclared adviser. Adult students are urged to meet with advisers well before the beginning of the semester to determine course selections. For additional information on off campus, evening, weekend and online offerings and programs, contact the Office of Professional Training & Education at profdev@millersville.edu, or at (717) 872-3030.

SPECIAL ADMISSION STUDENTS

POST-BACCALAUREATE TEACHING CERTIFICATION STUDENTS

STUDENTS FROM FRANKLIN & MARSHALL COLLEGE AND LANCASTER THEOLOGICAL SEMINARY

Millersville University has reciprocal agreements with these two institutions. Franklin & Marshall College may, upon appropriate authorization, send students to Millersville for courses not offered at Franklin & Marshall, without a tuition charge by Millersville. Similarly authorized full-time graduate students from Lancaster Theological Seminary may enroll in undergraduate and graduate level courses at Millersville without a tuition charge by Millersville.

Millersville students may also take advantage of these agreements and enroll for courses at these institutions. See the *Special Academic Opportunities* section for more information.

HIGH SCHOOL STUDENTS

not received a grade, and which has not been waived because of demonstrated competency or advanced placement. Because of content and structure, some courses may not be challenged by examination.

Contact the registrar's office, Lyle Hall, for instructions, fee information and approval forms. The examination is given at the convenience of the instructor. The grade earned is entered on the student's record and calculated into the GPA whether or not a passing grade is earned.

In some instances department chairpersons may approve the use of a CLEP subject examination to challenge a course by examination. See the preceding section on CLEP for more information.

INTERNATIONAL BACCALAUREATE (IB) PROGRAM

Millersville University recognizes the value of the rigorous IB Program and considers it seriously when evaluating the credentials of admission applicants. For students entering with the IB Dipolma or Certificate, credit may be awarded for a score of five or higher

EXPENSES AND FINANCIAL AID

As a state-owned university, Millersville University provides educational opportunities that surpass those available at many more costly institutions. Public funds appropriated by the Pennsylvania legislature pay for building construction costs and approximately half of Millersville's operating budget. The state appropriation is in essence a scholarship that permits a quality education at an affordable price for every student.

The table below and other information in this section presents the most recent approved costs for the academic year (September to May) for students living in University residence halls. Tuition and fees are subject to change at any time.

	Residents of Pennsylvania	Nonresidents of Pennsylvania
Tuition*	$5,177.00	$12,944.00
General Fee*	1,272.00	1,272.00
Technology Fee*	175.00	264.00
Room and Meals	6,876.00	6,876.00
Estimated books and supplies costs	900.00	900.00
Estimated personal costs	1,714.00	1,705.00
Estimated travel costs	700.00	700.00

**07-08 rates. Rates will change.*

PAYMENT

3. Pennsylvania residency by parent(s) or guardian(s) of students who are minors. The age of majority in Pennsylvania for establishing an independent residence for tuition purposes is 22. A minor may, however, prove financial emancipation and independence through clear and convincing evidence.

4. A United States government employee or a member of the armed forces who was residing in Pennsylvania immediately prior to entering the government service and who has continuously maintained Pennsylvania as his or her legal residence is considered

$1,412.00	14 meals per week, plus $100 Flex*
$1,180.00	9 meals per week, plus $100 Flex*
$762.00	5 meals per week, plus $100 Flex*
$801.00	Block Meals
$200.00	Flex Only

*Note: Flex dollars will now roll forward from fall to spring.

The 2008 summer meal plan charge for a five-week summer session:

$451.70	19 meals per week
$436.35	14 meals per week
$361.00	9 meals per week
$233.35	5 meals per week

Visitors and students who live off campus are also welcome to dine in University dining halls on an occasional basis. Breakfast costs $4.75*; lunch, $6.70*; dinner, $8.60*; and brunch, $8.60*. Rates for special events are available from the University Food Service, Gordinier Dining Hall. **Rates are subject to change.*

All students who leave the University, regardless of reason, receive a prorated refund of meal plan fees, provided they complete the official withdrawal process.

Millersville Advantage Plan (MAP). Money deposited into your MAP account may be used to make purchases at campus locations that display the MAP logo, including the University Store. You can open a MAP plan with a minimum deposit of $50 and additions of $25. Please notate MAP and the amount being sent on your statement.

MAP must be paid by check, money order or credit card. Financial aid and MIPP balance may not be used.

Refunds. A prorated refund schedule for housing and meal plan fees for students who withdraw from the University is as follows:

Before student move-in day	100%
First week	90%
Second week	80%
Third week	70%
Fourth week	60%
Fifth week	50%
After fifth week	No refund

OTHER FEES

Application Fee: Undergraduate Admissions. Students who apply and are admitted to the University through the admissions office and are seeking an undergraduate degree, will pay the undergraduate application fee of $40 only once. After the application fee is paid the first time, any subsequent reapplication will not require payment of a second application fee.

No application fee will be required for transient and nondegree admission using the Part-time Nondegree Application (blue form).

Application Fee: Graduate Admissions. People who apply for admission through the graduate studies office, regardless of the type of admission they seek (e.g., master's degree, certification, nondegree), will pay a graduate application fee of $40 only once, provided that they have not been previously denied admission for academic reasons or dismissed from the University. Those in the latter categories who wish to reapply shall pay the graduate application fee with the submission of each new application.

Late Payment Fee. Students who do not return the billing statement or full settlement of their by the due date are charged $25.

Late Registration Fee. Students who register after the start of the semester/session are charged $25, except when permission for late registration has been granted by the registrar.

MIPP

Library Overdue and Items Fees. Please contact the library for information at (717) 872-3612 or visit the MU website, www.millersville.edu.

DEPOSITS

Advance Matriculation Deposit. A $100 deposit is required upon acceptance of the offer of admission. It may be used toward payment of tuition. It is transferable on a one-time basis to a revised admission date upon the approval of the director of admissions. It is fully refundable only for medical reasons certified in writing by the attending physician or for compulsory military service certified in writing by military authorities. A partial refund ($25) of the fall semester deposit is made if written notification is received by the admissions office no later than May 15.

Advance Housing Deposit. Students admitted to University residence halls must pay a deposit of $125 each year. It may be applied only toward payment of residence hall fees for spring. It is transferable on a one-time basis to a revised admission date upon the

A scholarship is a financial grant for a student's University expenses. These grants are usually given based on financial need and/

Robert V. and Virginia K. Brown Scholarship in Industrial Technology. Awarded to a rising sophomore majoring in technology education or industrial technology. The scholarship may be renewed for four additional semesters providing the student maintains a 3.2 GPA.

C-P Flexible Packaging - Gary Nicholas Memorial Scholarship. Awarded to a full-time rising senior in the occupational safety and environmental health program at MU, who matriculated from York County. Recipient must have a GPA of 3.2 or greater in the program, with consideration given to an acceptable overall GPA. Scholarship to be awarded primarily on the basis of merit, without necessary consideration of financial aid.

Campus Club Scholarships. Awarded to members of the junior class who have maintained a GPA of 2.0 or higher and who are dependent wholly or in large part upon their own efforts for financing an education.

Harry E. Canter Statistics Scholarship. Awarded to the junior or senior mathematics or computer science major who has shown the most outstanding performance in statistics.

***Joseph Anthony Caputo and Linda Ryan Caputo Scholarship in Chemistry.** Awarded to an incoming chemistry major based on merit as demonstrated by class rank performance, scholastic aptitude examinations and other criteria as recommended by the admissions office.

Lt. Col. Jo Ann Cashman Scholarship Awarded annually to a student enrolled in the nursing curriculum who is in good academic standing. Preference may be given, but is not limited to, students who are in financial need.

***Ethel Ulrich Cassel and Francis Cassel Memorial Scholarship.** Awarded to an incoming freshman organ or piano music major at MU. The scholarship may be renewed annually providing the recipient remains in good academic standing, retains a concentration in organ or piano, and fulfills the performance requirements set by the Salem United Methodist Church.

Ernest and Mary Chamberlin Scholarships. Awarded to students in the Adult Continuing Education program who have earned the highest number of credits (up to 90) and who have a GPA of at least 3.8 in their current program of study.

Christina A. Ciallella Memorial Scholarship. Awarded to a female student who has completed at least 60 credits at MU with no restriction upon major and based upon financial need.

Class of 1916 R. Bruce Walter Scholarship. Awarded for an academic scholarship as determined by the University president or designee.

Class of 1917 Sanders P. McComsey Scholarship. Awarded to a student who excels in English, payable at the end of the junior year.

Class of 1927 Memorial Scholarship.

***Dr. Dominick '53 and Mrs. Helen DiNunzio Scholarship Endowment.** Awarded to a full-time incoming freshman from Bristol Borough High School in Bucks County, Pa., who graduated in the top 10% of his/her high school graduating class, who achieved an average score of 1200 on his/her SAT, and who exhibits high standards in character and leadership. If no student from said high school is accepted to Millersville University for admission, a student shall be chosen from among the other high schools in Bucks County, Pa.

William H. and Alma P. Duncan Scholarship in Elementary Education. Awarded to an elementary education major on the basis of financial need, excellence in scholarship, leadership qualities and service to others.

***Dean Dutcher M**

Alan S. & Adeline Holliday Scholarship. Awarded to a student who demonstrates scholastic ability and financial need.

***James Hughes Memorial Scholarship.** Awarded to an incoming freshman from the city of Philadelphia who has financial need.

***R. Clinton and Dorothy Hughes & Kathryn Hughes Seaber Vocal Music Scholarship.** Awarded to a freshman vocal music major. May be renewed for three additional years providing the student remains a voice music major in good academic standing and progressing toward graduation.

***Russell C. Hughes English Scholarships.** Awarded to two incoming freshman students majoring in English, for the period of time each is in good academic standing and majoring in English at Millersville University. Students must have a minimum academic average of 3.0 and have a history of participation in high school publications.

Hazel Jackson Scholarship. Awarded annually to an African-American student majoring in secondary education language arts or the

Kurtz J. & Mary A.C. Mock Memorial Scholarship. Awarded to a female enrolled in the elementary supervisor certificate program who possesses either a bachelor's or master's degree from Millersville University. Recipient must have a minimum 3.0 GPA and demonstrate superior leadership qualities.

Charles E. Muench and Betty F. Muench Scholarship in Communications and Theatre Arts. Awarded to an entering senior majoring in communication and theatre arts who has demonstrated financial need, has a minimum overall academic average of 3.0, and exemplifies commitment to and excellence in the discipline of communications.

***Edna H. Myers Mathematics Scholarship.** Awarded to an incoming freshman majoring in mathematics.

John David Neider Memorial Scholarship. Awarded to a junior who has made a significant contribution to the success of musical or dramatic performing arts at Millersville and has a GPA of at least 2.0.

Neimeyer-Hodgson Student Research Grant. Awarded to a student attending Millersville University in pursuit of the baccalaureate degree.

Paul H. Nichols Scholarship. Awarded to a junior earth sciences major who is chosen on the basis of outstanding motivation and academic excellence.

Nontraditional Student Scholarship. Awarded to an independent full-time or part-time undergraduate student who is returning to school, has earned at least 15 credits at Millersville University and has demonstrated financial need.

***Fred E. Oppenheimer Endowment.** Awarded to a freshman foreign language major based on academic excellence, dedication to foreign language study and financial need.

***James C. Parks Scholarship in Botanical Research.** Awarded to an incoming freshman with an interest in botany. The recipient of this scholarship is expected to develop a botanical research project in collaboration with a faculty member that will lead to the presentation of research results in the Dr. James C. Parks Memorial Lecture in the recipient's senior year.

Predmore-Cornogg Scholarship. Awarded to a rising junior or senior majoring in geography who demonstrates a strong commitment to the discipline of geography, with first preference to a student with an interest in land planning. The recipient must be in good academic standing with a cumulative GPA of 2.5 or higher, demonstrates financial need. Renewable in the subsequent year.

***Ratzlaff Scholarship.** Awarded to an incoming biology major. The scholarship may be renewed for three additional years if the student remains a biology major and maintains a GPA of 3.0 or greater.

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***Ellen Currier Sellers Scholarship for Organ Performance.** Awarded to an incoming freshman or current University student who is a keyboard major with preference given to music majors/minors studying organ. Renewable providing the student continues to progress in organ study and maintains at least a 3.0 GPA, and remains a music major/minor.

Margaret K. Shenk Nursing Scholarship. Awarded to nursing students from Lancaster County who successfully complete two semesters of the nursing degree program. Financial need shall be considered.

N.E. Shoemaker Biology Teaching Scholarship. Awarded to the sophomore secondary education biology major who has earned the highest GPA.

***Amos L. Shopf Scholarship for Lancaster County Students.** Awarded to a freshman who is a graduate of a secondary/high school in Lancaster County, Pa. Based on merit performance and financial need. May be renewed for three additional years provided the student maintains good academic standing.

Dalton E. Smart Humanitarian Scholarship, Industry and Technology Department. Awarded to a full-time junior or senior industry and technology student making a significant contribution to the education of classmates through positive interactions, thought-provoking questioning and insight into the impact of technologies on humans. The recipient must maintain a 2.5 overall GPA.

***Elizabeth Smithgall Scholarship.** Awarded to students who are ranked in the top 10% of their class, demonstrate financial need and have a native language other than English.

Blanche Henninger Snyder ’18 Scholarship. Used to support a scholarship in a curriculum as determined by the president of the University. Recipient will be selected by the president or designate.

George F. Stauffer Scholarship. Established by Dr. George F. Stauffer and Lelia M. Stauffer. Awarded to a student who has completed the sophomore or junior year and has demonstrated academic excellence in a physical science major.

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Thomas G. Versprille Memorial Scholarship. Awarded to a student in good academic standing who is an active, outstanding sophomore or junior member of the Millersville University cheerleading squad, who has participated in MU cheering for at least one year, and is a full-time student with a 2.30 GPA at the time of the award. A member anticipating continued service to the squad is preferred. The scholarship recipient is to be chosen by the cheerleading coach and the director of women's athletics.

Joseph E. Walker American History Scholarship. Awarded to a worthy junior who intends to teach American history on a elementary, secondary, or college level. Secondary consideration is given to a junior history major who excels in American history.

Dr. Samuel P. Wallace '41 Scholarship. Awarded to a rising junior or senior education major with financial need and a cumulative GPA of 3.0 or greater. First preference to a student who intends to teach in mathematics, second preference to teach science, third to teach other subjects.

Theodore Weeks APICS —The Educational Society for Resource Management Scholarship. Given by the Lancaster-York

Leah Fudem Photographic Service Award. Awarded to two students for outstanding photographic service to *The Snapper* or the *Touchstone.*

Verda M. Fulmer Award. Established by the Philadelphia Alumni Branch/MU Alumni Association, and awarded to an outstanding senior elementary education major.

Fulton Bank Award in Economics. Awarded to a student who, in the judgement of the economics department, has written the best essay on an aspect of banking.

Roy and Mary Garden Gamber - Helen L. Koontz Award in Elementary Education. Awarded for educational expenses to a junior or senior education major who demonstrates a commitment to a career in teaching. Two awards will be given, at least one must be directed to a candidate committed to teaching elementary education.

Geography Faculty Award. A certificate and an appropriate gift, usually a book, presented annually by the geography department faculty to a geography major who graduates with honors.

D. Joan Godfrey Nursing Award. Awarded to one to three senior nursing majors on the basis of participation in the nursing program, club and other campus activities, involvement in the nursing profession and academic standing.

John K. Harley and Grace W. Evans Award. Awarded to a student who has maintained the highest standing in scholarship and

Phi Sigma Pi Award. Awarded to a graduating Phi Sigma Pi member for scholarship, leadership, character and outstanding service to the University. Service keys are awarded to graduating members of the fraternity using the same criteria.

Philadelphia Alumni Award. Awarded to a technology education major who demonstrates the best qualities of a technology teacher.

Polymer Education Undergraduate Award. Awarded to a sophomore/junior level chemistry major who has a minimum GPA of 3.5 and who has earned an "A" in each semester of the two semester organic chemistry course sequence.

Psychology Club Award. Awarded to a senior psychology major for outstanding interest and enthusiasm in psychology, service to the department, and scholarship as evidenced by a GPA of at least 3.0.

Psychology Faculty Awards. Established by the psychology faculty and awarded to outstanding junior and senior psychology majors.

Keith Ranck/Ralph and Judy Anttonen / WIXQ Award. Awarded to a student with junior class standing at the end of the spring semester, who is a member of the WIXQ Executive or Station Council and who has worked at WIXQ for at least two semesters.

Margie L. Ranck Award. Awarded to a student who has completed the junior year on the basis of outstanding intellectual attainment and good character.

Dr. Gary W. & Jacqueline Reighard Award for Outstanding Leadership. Awarded to a student for outstanding leadership who has completed at least 60 credits and who possesses at least a 2.75 GPA. Selection is based upon past contributions to Millersville University and potential for future development as a leader.

Henry J. Rutherford Memorial Award. Awarded to a junior or senior who has been constructively involved in environmental action and environmental enrichment activities.

Irene P. Seadle German Section Award. Awarded to a senior German major who has done excellent work in German studies and contributed significant service to the German section.

Harold W. and Miriam W. Shaar String Award. Awarded to a sophomore or junior music education major who has demonstrated considerable progress in playing a string instrument, shown an interest in teaching string instruments, and contributed to the musical enrichment of University musical organizations.

Social Work Faculty Award. Awarded to a senior social work major for academic excellence.

Social Work Organization Award. Awarded to a senior social work major for academic excellence and contributions to the Social Work Organization.

Society for the Advancement of Management Award. Presented by the Millersville student chapter of S.A.M. to a junior or senior who has maintained at least a 3.0 GPA and exhibited outstanding management potential through participation in co-curricular activities in business administration.

Charles D. Spotts Naturalist-Humanist Award. Awarded to a student who has contributed most to the naturalist humanist ethic.

Mary R. Slokum Sproul Prize. Awarded to a student for excellence in public speaking.

J. Richard Steinmetz Technology Teaching Award. Awarded to a technology education senior who, in the judgment of the industry and technology faculty, has high potential to become a successful teacher as evidenced by outstanding performance in student teaching and excellence in professional technical areas.

Drs. George F. & Helen A. '64 Stine Sociology Award. Awarded annually to an outstanding sociology major who has obtained 75 to 90 credits at the time of selection, with a cumulative grade point average in the major of at least 3.0, and an overall grade point average of 2.5.

Mark Stine Scholastic Attainment Award.

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ACADEMIC REQUIREMENTS

THE BACCALAUREATE CURRICULUM

Millersville University's baccalaureate degree programs have four common curricular elements:

1. Proficiency requirements in English composition and mathematics.

2. The general education program, which constitutes about half of the curriculum (51 of the 120 minimum credits required for graduation).

3. The major program, which usually constitutes most of the other half of the curriculum.

4. Electives courses, if needed, to meet the minimum of 120 credits required for graduation. (A few programs require more than 120 credits for graduation.) Students may combine elective and general education courses to complete a minor.

Within each of these components, students have many choices in developing programs of study. They have a challenging and responsible role in planning the substance of their program.

Students are reminded that a full-time semester course load consists of 12 credit hours. However, it is necessary to average at least 15 credit hours each semester in order to graduate in 4 years (8 semesters).

Final responsibility for each student's program rests with the student. The role of the adviser is just that—to advise. Students are expected to familiarize themselves thoroughly with program requirements for their major described in this catalog, the Curriculum Record Form and the computerized degree audit (DARS). This computerized audit report is available to help students monitor progress toward completion of their major, minor, and general education requirements.

PROFICIENCY REQUIREMENTS

MATHEMATICS

1. All undergraduate students must demonstrate minimum levels of proficiency in mathematics.
   a. All entering undergraduate students are required to take part in the mathematics placement process.
   b. The mathematics department determines the test(s) and the criteria for course placement.

2. Students placed in a developmental mathematics course are required to enroll in that course. Such students must demonstrate proficiency by satisfactorily completing the course with a grade of C- or above prior to taking any mathematics course at the 100 level or higher.

3. Students who must take developmental mathematics earn course credits and the grade is counted in the cumulative grade point average, but developmental course credit cannot be counted towards fulfillment of the general education or graduation requirements for the baccalaureate or associate degree.**TH**

CRITICAL THINKING ACROSS THE LIBERAL ARTS

2. Students will demonstrate foundational knowledge of the important ideas and methods of different ways of knowing as follows:
   a. in the humanities, students will analyze and interpret existing works of literature and the arts.
   b. in the sciences, students will engage in the scientific method, laboratory study, appropriate technology, and mathematics to investigate, evaluate, and apply scientific concepts and theories.
   c. in social sciences, students will develop the necessary tools of critical thinking, inquiry, and diplomacy to participate effectively in our democracy and the increasingly complex global society.

CONNECTIONS AND EXPLORATION

3. Students will connect important ideas and methods of inquiry from different disciplines as a means of becoming holistic and responsible citizens in a diverse and technologically complex, global community. Students will:
   a. demonstrate civic and social responsibility.
   b. grow in their engagement with peoples of diverse histories and communities, both inside and outside the United States.
   c. build the foundation for a lifelong process of understanding, developing, and monitoring healthy lifestyle behaviors in all dimensions of wellness, including physical, social, emotional, intellectual, spiritual, and environmental wellness.
   d. gain personal enrichment by developing new interests that can be enjoyed throughout a lifetime.

To meet these objectives, the general education program is organized into a structure with three components: Foundations for Lifelong Learning, Critical Thinking across the Liberal Arts, and Connections and Exploration.

GENERAL EDUCATION STRUCTURE (minimum 51 credits)

FOUNDATIONS FOR LIFELONG LEARNING COMPONENT

ENGL 110: English Composition (0-3 credits). This college-level competency requirement is in addition to the pre-college proficiency requirement described earlier. Competence in English composition must be demonstrated in one of the following ways before the junior year:

1. Achieving a combined score of 1100 in the Verbal portion of the Scholastic Assessment Test (SAT I) and the SAT II English Writing Test.
2. Achieving a score of 3 or higher in the Advanced Placement (AP) test in English Composition.
3. Achieving a satisfactory score in the CLEP subject examination in English Composition.
4. Passing the English Composition Competency Examination administered by the English department at the beginning of each fall and spring semester.
5. Earning a grade of C- or higher in English Composition (ENGL 110).

COMM 100: Fundamentals of Speech (3 credits). College-level competency in speech must be demonstrated in one of the following ways, preferably before the junior year:

1. Earning a grade of C- or higher in a competency examination administered by the Communication & Theatre department. To take this examination, register with the Communication & Theatre department by the end of the drop-add period.
2. Earning a grade of C- or higher in Fundamentals of Speech (COMM 100).

Approved MATH Course (3-4 credits). To develop mathematical reasoning ability, at least one approved General Education math course must be successfully completed.

Advanced Writing (3 credits). A course to further enhance writing skills. The courses currently approved to meet this requirement are ENGL 311, ENGL 312, ENGL 313 and ENGL 316. Some departmental honors theses (HNRS 499) are approved to meet this requirement. Some majors require a specific Advanced Writing course. Students should consult the appropriate curriculum sheet and their academic advisers before choosing a particular Advanced Writing course.

CRITICAL THINKING ACROSS THE LIBERAL ARTS COMPONENT (9 courses – min. 27 credits)

Three courses (min. 9 credits) each in Humanities and Fine Arts (G1), Science and Mathematics (G2), Social Sciences (G3). In Science and Mathematics, two of the three courses must come from Biology, Chemistry, Earth Sciences, and/or Physics including one which has a Laboratory (L) component.

To achieve greater understanding in some disciplines while maintaining breadth of study, exactly two courses within each Liberal Arts area must be from a single department. Additionally, at least three courses taken throughout the three Liberal Arts areas must be at the 200 level or above.

Up to 6 courses required for the major from departments outside the major may be credited toward the Liberal Arts Component, but courses taught by the student's major department may not be credited here.

CONNECTIONS AND EXPLORATION COMPONENT

First Year Inquiry seminar (0 or 3 credits). Incoming students are encouraged to take a First Year Inquiry (FYI) seminar which will count as part of a Connections and Exploration Component. The FYI seminar is a component of General Education specifically

5. Teacher certification credits may not be counted toward a second degree.

6. When there is overlap in the majors of the first and second degrees, the 50 percent limitation in requirement four above and the limited course offerings in some departments may preclude the pursuit of a second degree.

SPECIAL ACADEMIC OPPORTUNITIES

HONORS COLLEGE AND DEPARTMENTAL HONORS

Millersville University offers a number of programs to help exceptionally talented students develop their potential. Students who complete the programs earn special recognition.

UNIVERSITY HONORS COLLEGE

The University Honors College challenges talented students while encouraging them to develop their intellectual potential. The program introduces students to the main currents of Western thought and culture and develops writing, research and analytical skills. Enrollments in honors classes are limited to facilitate student-faculty interaction. Students who successfully complete the program are awarded the University Honors baccalaureate at graduation.

Invitations to the program are extended to entering freshmen who have combined SAT I scores of 1200 or above and are in the top 10 percent of their high school class. Other interested freshmen and currently enrolled students with cumulative grade point averages (CGPAs) of at least 3.35 are encouraged to apply for admission to the director of the University Honors College.

To remain in good standing in the Honors College, students must maintain a GPA of at least 3.0 in the freshman and sophomore years, 3.25 in the junior year, and must have a 3.35 GPA at graduation.

To receive the University Honors baccalaureate, students must:

1. Earn a cumulative GPA of at least 3.35.

2. Earn a minimum of 30 honors credits and fulfill the curricular requirements. Honors credit is awarded only for those honors courses in which a B- or higher is earned.

3. Complete an Honors Independent Study (HNRS 489) and an Honors Senior Thesis (HNRS 499). Criteria are the same as for departmental honors (see section below) with the additional requirement that the thesis should be examined by and defended before a committee that includes a member or former member of the University Honors College Committee and includes an authority from

INDEPENDENT STUDY

Independent study allows students to pursue with faculty supervision and guidance, an academic area of interest not available through an established course. To apply, complete a special studies assignment form, available in department offices, and obtain approval for the proposed topic and faculty supervisor from the department chairperson and school dean before the start of the term.

INDIVIDUALIZED INSTRUCTION

Individualized instruction allows students to complete an established course during a semester in which it is not offered. Approval to pursue a course through individualized instruction is granted only under special circumstances. To apply, complete a special studies assignment form, available in department offices, and obtain approval for the proposed topic and faculty supervisor from the department chairperson and school dean before the start of the term.

TAKING GRADUATE COURSES AS AN UNDERGRADUATE

Well-qualified Millersville University undergraduates may enroll in graduate courses for undergraduate or graduate credit. Specified conditions apply to each of these two credit alternatives.

Undergraduates may enroll in 500-level graduate courses for undergraduate credit with permission of the instructor and adviser. The credits earned count toward baccalaureate degree requirements and cannot be converted to graduate credits.

An undergraduate with a 3.0 GPA or higher may enroll in 500- and 600-level graduate courses for graduate credit. The student must have a maximum of 15 semester hours to be completed in the baccalaureate rogram.ex379Written permission must be acquired from the adviser, the course instructor, the graduate program coordinator and/or chair of the department offering the course, and the dean of graduate studies. The undergraduate will also need to be admitted as a nondActualTegraduate student.

A maximum of 9 graduate credits may be earned by an undergraduate. These credits may not count toward the completion of the student's baccalaureate degree.

PASS-FAIL OPTION AND AUDITING COURSES

The pass-fail option provides students the opportunity to pursue a course without the usual pressure of earning a grade.

Auditing a course allows a student to attend classes and participate in discussions without the pressures of taking examinations, writing papers, or fulfilling other requirements generally associated with earning credit. Students must submit requests to take a course on an audit or pass-fail basis by the end of the add period. SlTethe *Grades & Policies* section for more information.

DEVELOPMENTAL COURSES

Course numbers beginning with a zero are pre-college developmental courses that provide opportunities for students to remediate academic skill weaknesses and develop basic proficiency. They are available in communications, English, reading and mathematics. Placement in these courses is recommended, and under some circumstances required, following an assessment of student's basic skills. For more information, see the section on *Proficiency Requirements.*

A grade of C- or higher is required to demonstrate proficiency in a developmental course. Students who must take developmental course(s) earn course credits and the grade is counted in the cumulative grade point average, but developmental course credit cannot be counted towards fulfillment of the general education or graduation requirements for the baccalaureate or associate degree.

UNDECIDED MAJOR STATUS

Students may seek admission to Millersville without selecting a major. Special academic advisers are assigned to guide undecided students through the general education requirements and assist them in exploring potential majors through the Exploratory Program.

Students who qualify for admission to Millersville, but do not meet admission criteria for a selected major, are classified as undecided until they qualify for study in the major of their choice.

Students with at least 45 credits passed and in undecided status, or changing to undecided status must either:

1. Declare and be accepted into a major, or

2. Complete a review of academic goals as follows: the student, in consultation with an assigned adviser, must propose and have approved by the adviser each semester, an academic plan of action which includes a realistic timeline for the completion of degree requirements. The approval form will indicate whether the student is waiting to get into a major and, if so, the reason for nonacceptance into that major. A copy will be filed in the Office of the Registrar.

3. A student may sign a statement which indicates awareness of the ramifications of remaining in an undecided status but may choose to continue to remain in that status.

Permission to register will be granted only if one of the above requirements is completed.

OFF-CAMPUS ACADEMIC OPPORTUNITIES

COOPERATIVE EDUCATION/INTERNSHIP

Cooperative Education (Co-op) and internships are optional learning experiences that take place in a work setting rather than in a classroom. Co-op and internships are the result of partnerships between the University and employers in business, industry, government, and human services. The program is flexible, allowing students to work full-time or part-time. They may work locally, nationally or internationally. This work experience becomes part of the total learning experience, giving the student's academic program a sense of reality and relevance. As a result of the cooperative education program, students in any major can receive work experience,

earn income and apply learned theories. Co-op also provides the opportunity for students to gain greater insight into their chosen career, either strengthening or redirecting their career choice.

The Millersville University student may begin to show his/her interest in the cooperative education program as early as the first semester, freshman year. Sophomores and juniors (in some instances, seniors, too) are highly encouraged to take the first steps to find out more about Cooperative Education by completing an online orientation found at www.millersville.edu/elcm.

At the discretion of the department, a minimum of 3 s.h. up to a maximum of 12 s.h. may be counted in the major or as electives toward normal graduation requirements. Additional credits will be counted over and above the normal graduation requirements. A cooperative education student may participate in a maximum of four cooperative experiences. As with any course there are academic requirements as well as appropriate tuition for each experience.

The cooperative education program is optional for most Millersville majors. Students must, however, meet the following criteria for participation:

1. Be enrolled in a degree program at Millersville University.
2. Have successfully completed at least 24 college credits (transfer and second degree students must successfully complete 12 credits at MU).
3. Have a GPA of at least 2.0 (individual departments may stipulate higher GPA requirements).
4. Have approval from the appropriate academic department to participate.

For more information, contact the Office of Internships and Civic Engagement Services or go to www.millersville.edu/elcm.

GRADUATE AND UNDERGRADUATE COURSES

Credit-bearing courses are scheduled at off-campus sites as a convenience to working professionals. Graduate courses for teachers are available most semesters online, at schools in local school districts, and/or at off-campus locations in Lancaster, York, and Harrisburg.

Undergraduate courses are offered each semester at several sites in central Pennsylvania. Students enrolled in off-campus sites are welcome and encouraged to use campus facilities and services. Courses are scheduled off-campus to assist part-time students and working adult students. For information about off-campus courses, contact the Office of Professional Training & Education, (717) 872-3030.

NONCREDIT COURSES

The Corporate University at Millersville provides customized and training solutions to businesses or community organizations. For information, contact the Office of Professional Training & Education, (717) 872-3030 or profdev@millersville.edu.

STUDY ABROAD

Study abroad can be a valuable and important part of a student's undergraduate education. Regardless of a student's major, learning firsthand about another way of life, and seeing the world from another culture's perspective, are invaluable assets for success in our global society.

Millersville University students may study abroad in nearly every country worldwide for a summer, a semester or an academic year. Although most students who study abroad choose to do so during their junior year, students may study and/or do an internship abroad for University credit any time after completing 24 academic credits. Student teaching abroad also is available.

Whether fluent in foreign languages or only English, students may participate in study abroad through Millersville's own international partners, through other accredited U.S. institutions' programs or directly through many international universities. Millersville offers its own student exchange programs with London Metropolitan University in London, United Kingdom; University of Strathclyde in Glasgow, Scotland; Saint Mary's University College in Belfast, Northern Ireland; Kansai Gaidai University in Osaka, Japan; Philipps-Universität Marburg, in Marburg, Germany; Pontificia Universidad Católica de Valparaíso in Valparaíso, Chile; Foro Europeo School of Business in Pamplona, Spain; Universidad de Burgos in Burgos, Spain; University of KwaZulu-Natal in Durban, South Africa; Université de Caen Basse-Normandie in Caen, France; and American Business School Paris in Paris, France. International internship placements as part of a formal study abroad program are possible through the London Metropolitan, Valparaíso, Foro, Marburg and American Business School programs.

To be eligible for any study abroad experience, students must have completed at least 24 college credits; maintained a minimum 2.0 GPA prior to departure (individual programs may have higher requirements); and received advanced approval from the Office of Global Education and Partnerships.

For more information about study abroad, contact Dr. Kirsten Bookmiller, director of global education and partnerships, Cumberland House, (717) 872-3884 or email globaleducation@millersville.edu.

STUDY AT OTHER INSTITUTIONS

Millersville students may take courses at other colleges and universities for transfer back to Millersville. Many students, for example, take summer courses at a college near their home. Students must obtain approval in advance from their adviser, the department chairperson and the registrar. Approval forms are available in the registrar's office or on the MU website located under "quick links," Student Forms Center. For more information, see the *Transfer Credit* section.

Exchange Agreement with Franklin & Marshall College. Through this exchange agreement, full-time Millersville students may, with approval, pursue courses not available at Millersville at Franklin & Marshall College. No tuition is charged by Franklin & Marshall

College. This agreement does not include courses offered during the summer at Franklin & Marshall.

Exchange Agreement with Lancaster Theological Seminary. Through this exchange agreement, full-time Millersville students who qualify for admission to graduate level courses may, with approval, pursue courses not available at Millersville at Lancaster Theological Seminary. No tuition is charged by the seminary.

3-2 Cooperative Programs in Engineering. Physics-engineering and chemistry-engineering majors are offered in cooperation with Pennsylvania State University. In addition, the physics department has an engineering program with the University of Southern California. These programs require three years of study at Millersville with a major in physics or chemistry and two years in residence in the engineering program of one of the cooperating institutions. Interested students should contact the physics or chemistry department chairpersons for further information.

INTERNSHIPS

French
German
Mathematics
*Special Education
Music
Physics
Social Studies
Spanish
Technology Education

*Changes to these programs are anticipated. Please consult with your academic adviser.

MARINE SCIENCE CONSORTIUM

Millersville is the founding member of the Marine Science Consortium; 14 colleges and universities that operate a marine station at Wallops Island, Virginia. The consortium has several seagoing vessels and laboratories with biological and oceanographic equipment. Living facilities for students and staff are provided at the station.

Four three-week sessions are offered at Wallops Island each summer. See the biology and earth sciences department listings for information on many of the courses offered. For the first round of consideration, applications for these courses must be received by February 1. For more information, contact the School of Science and Mathematics.

SPECIAL EVENTS

For more information on special events at Millersville, visit the University home page: www.millersville.edu.

SPECIAL FUNDS

Samuel Bechtold Stayer and Caroline Nissley Stayer Endowment. Awarded to faculty within the School of Education for activities which enhance both their professional development and the academic development of their students, and ensure that Millersville University maintains a leadership role for programs in education.

Albert W. Bender Memorial Endowment. Used for acquisition of materials for the University library.

Brenner Fund. Used for acquisition of materials for the University library.

Class of 1938 Endowed Fund. Used in support of University projects as determined by the president of the University.

Class of 1939 Endowed Fund. Used in support of University projects as determined by the president of the University.

Class of 1949. Funds to be used for library acquisitions.

Class of 1950. Funds to be used for purchasing computers for classrooms and the library, as determined by the University president or designee.

Mary Ross Ezzo. Funds to be used toward a literary lectureship.

Paul G. Fisher Endowment for a Symphonic Guest Artist. Funds are directed to the honoraria and expenses to bring distinguished symphonic band conductors or solists to the University to perform primarily with the MU Symphonic Band.

Helen A. Ganser Endowment Fund. Used to purchase library materials.

Glenna M. Hazeltine Endowment.

Conrad Nelson Endowment in the Fine Arts. Funds used to fund an Artist-in-Residence program.

Melzer R. Porter Memorial Library Fund. Used to purchase music literature for the music collection of the library.

Carl R. Rees Mathematics and Computer Science Fund. Used to advance faculty development in the mathematics and computer science departments.

Elsie S. Shenk Endowment. Used in support of the Wellness and Women's Center Program.

Jestina Stahl Endowment for Library Support. Funds are directed to the acquisition of materials for the library.

Samuel Bechtold Stayer and Caroline Nissley Stayer Endowment. Awarded to faculty within the School of Education for activities which enhance both their professional development and the academic development of their students, and ensure that Millersville University maintains a leadership role for programs in education.

Carl Van Stephenson Memorial Library Fund. Used to purchase library books.

Donald E. Weiman Instructional Equipment Endowment. Award used to support the repair or purchase of equipment for the chemistry department.

Harold A. Weirich Memorial Lecture in Biology Endowment Fund. Funds support annual lecture in biology.

Women's Issues Endowment. Awarded annually to members of the University community for conducting or disseminating research or organizing programs that focus on issues of central concern to women.

David Zubatsky Endowment for International used for of of to Universitf to

AU	Audit	*
X	Proficiency in Progress	*
Z	No Adequate Evaluation for Grading	0.0

*Not considered in computing GPA

University policy accepts D- as minimum earned credit. There are certain general education and department major competency requirements that are satisfied only by a higher minimum grade. If a student earns less than this higher minimum grade in such a course, the credits will count toward earned credits but might not count toward completion of general education and department major requirements.

The *semester GPA* is the number of grade points earned in Millersville courses in a semester, divided by the number of credits in that semester for which grades calculated in the GPA were earned. Grade points for *each course* are calculated by multiplying the grade point value by the number of credits for the course.

The *cumulative GPA (CGPA)* is the total number of grade points earned in Millersville courses divided by the number of Millersville GPA credits. Credits from audited courses, subsequently repeated courses, advanced standing programs such as AP and CLEP, and transfer credits are *not* included in the CGPA.

The Millersville grade point average (GPA) is rounded to two decimal places, effective fall 2004.

GRADES AND POLICIES

Schedule Adjustment: Drop/Add. Students may drop or add courses by web or phone from the early registration period until the start of the term. Prior to the first day of classes, faculty signatures are not required to drop or add a course.

• The instructor recommends an extension with the approval of the department chairperson and dean of the school offering the course.

• The grade of "I" coverts to an F.

A faculty member may petition the school dean for a retroactive administrative withdrawal (W) from a course in which an incomplete grade cannot be resolved due to extraordinary circumstances, e.g., disability or death of the student or faculty. If the petition is approved, the dean will notify the registrar to record an administrative withdrawal for the course.

Students will not be graduated with unresolved incomplete grades that were recorded in spring 2005 or thereafter. Degree candidates are notified of the outstanding degree requirements.The degree is not conferred until all requirements have been met.

Pass/Fail Courses (P, F). In order to stimulate and/or satisfy intellectual curiosity, students are encouraged to engage in challenging study on an elective basis. The pass-or-fail option provides the opportunity for a student to enter a course that he/she might ordinarily avoid. Accordingly:

1. A student may enroll in no more than a total of two courses pass/fail.

2. The student needs to have passed 60 or more credits before electing a course pass/fail.

3. The student must have a minimum GPA of 2.80 or obtain permission of the instructor.

4. The pass/fail option is ordinarily restricted to courses numbered 300 or above. However, a 200-level course may be taken pass/fail with the prior approval of the instructor.

5. Courses taken to satisfy degree requirements for the major, whether offered by the department of the major or offered by other departments as required-related courses, may not be taken pass/fail.

6. Departments may designate which of their course offerings beyond degree requirements their majors may not take pass/fail.

7. Professional education requirements may not be taken pass/fail.

8. Courses taken to satisfy requirements for the minor may not be taken pass/fail.

9. No course used to satisfy general education requirements may be taken pass/fail, but if students take the same courses for other than general education purposes, they may take them pass/fail.

10. Courses taken on a pass/fail basis will be counted toward the total credit hour requirement for graduation, but those courses that are passed will not be included in the GPA computation on which academic honors and academic standing are based. Courses failed under the pass/fail option will be included when computing the GPA.

11. The minimum grade a student must earn in order to be awarded a 'pass' grade is D-.

12. The option to take a course on a pass/fail basis may be exercised until the end of the add period. Contact the registrar's office, Lyle Hall, for the appropriate form. Having properly registered for a course on a pass/fail basis, a student still has the option to take a letter grade instead of a pass/fail grade provided that the decision to change is filed with the registrar the week prior to finals week.

13. The pass/fail option is limited to students not on probation at the time of registration.

An undergraduate student may not take an undergraduate course of record more than three times. A course of record is defined as a course in which a student receives a grade of A, B, C, D, (including + and -) F, U, Z or W. The academic department offering a course may drop a student from a course if the student attempts to take a course more than three times.

GRADE CHANGES

Students are responsible for reviewing grade reports as soon as they are available and contacting their instructor about any grade in question. Grade changes may be made only by the instructor issuing the grade with the approval of the department chairperson and the school dean. Changes must be made in writing and submitted to the registrar within two months from the date the grade report was issued.

COPQUISITES

Courses may have a series of prerequisites (satisfactory completion of a prior course, minimum GPA or earned credits, placement test scores, etc.). Students who do not meet the stated prequisite(s) may be removed from a course at the discretion of the professor. The professor will notify the Registar and student by the end of the drop period.

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or between semesters, regardless of reason for withdrawal. Failure to complete this form will jeopardize a student's chances of future readmission.

4. In the case of foreseeable absences, students are encouraged to notify the faculty member in advance. A student who will miss class due to participation in an official University activity must notify the instructor well in advance of the activity to assure that the absence is excused.

ACADEMIC APPEALS

As with any academic issue, students may exercise their right to appeal adverse attendance decisions. Please refer to the *Academic Appeals* section for details.

COURSE NUMBER SYSTEM

Millersville University uses the following course numbering system:

000-099 Pre-college developmental courses.

100-199 Courses primarily designed for freshmen.

200-299 Courses primarily designed for sophomores.

300-399 Courses primarily designed for juniors and seniors.

400-499 Courses primarily designed for seniors.

500-599 First-level graduate courses (these courses may be taken by advanced undergraduates but may not be required of an undergraduate student).

600- Graduate level courses.

The following course numbers are reserved:

300, 400, 500	Cooperative Education experiences.
179, 279, 379, 479, 579, 679	Experimental courses.
489	Honors courses.
498	Independent study.
499	Departmental honors/thesis/University Honors College thesis.

DEAN'S LIST

A student is eligible for the Dean's List after a given semester if he or she has:

1. Earned a semester GPA of 3.50 or higher, and;

2. Attempted at least 12 credits of undergraduate course work, excluding those courses not used to compute the GPA.

GRADUATION HONORS FOR A BACCALAUREATE DEGREE

Effective with December 2009 graduation. Students who have earned consistently superior grades in their course work at Millersville University are recognized for their achievements at graduation with the designation of graduation honors. The student's diploma and University record carry the appropriate honors designation:

Cum laude for a cumulative GPA between 3.50 and 3.74

Magna cum laude for a cumulative GPA between 3.75 and 3.94

Summa cum laude for a cumulative GPA between 3.95 and 4.00

Eligibility for graduation with honors is determined based on the Millersville grade point average. Neither transfer work nor in progress courses are included in the honors GPA. For students who have been awarded academic amnesty, the pre-amnesty work is not included in calculating the honors GPA.

Changes in the eligibility for, or the level of, honors following the posting of grades for the final semester at Millersville will be reflected on the student's diploma and Millersville transcript.

To qualify for graduation honors, students must:

1. Earn a GPA of 3.50 or higher in work done at Millersville, and;

2. Complete at least 60 credits of Millersville course work.

Students who are completing a second baccalaureate degree program at Millersville are not eligible for graduation honor.

Graduation Honors for Associate's Degree Candidates. To qualify for the designation "with honors" on their diploma and University record, associate degree candidates must:

1. Earn a GPA of 3.50 or higher in work done at Millersville, and;

2. Complete at least 30 credits with grades A through D- of Millersville course work.

SERVICES FOR STUDENTS

Millersville University offers a number of programs and services designed to identify students' academic and personal needs, to develop their skills and abilities to meet their needs, and to support their academic efforts.

ACADEMIC ADVISEMENT

Millersville University considers academic advisement to be an integral part of the undergraduate experience from orientation to graduation. The academic advisement process is devoted to helping all students achieve their academic goals. This process involves the total campus community including students, faculty, staff, and the administration. Advisers work with students in the

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of Science and Mathematics (math tutoring available only for students with disabilities, all other students should seek math tutoring directly through the Math Assistance Center), and Aim for Success Program/Act 101 students.

UNIVERSITY DINING SERVICES

Millersville operates a comprehensive dining services program for students and guests of the University. All students are eligible to participate in the dining program. Students who reside in the residence halls and Shenks and Reighard Halls, are required to purchase a board plan. Off-campus students and commuters may participate in any of the University's meal plans which offer exceptional flexibility at various locations throughout the campus.

The University's main dining halls are located at the Upper Deck in Gordinier Hall and the North Side Bistro in Lyle Hall. Students and guests may dine at these locations as well as the Galley located in the Student Memorial Center (SMC). In addition, dining opportunities are available at the following cash operations: the Club de'Ville in the SMC, the Ganser Grind Coffee Shop in the library, Gordy's convenience store in Gordinier Hall, the deli-convenience store at The Cove in Lyle Hall and The Cyber Café at Caputo Hall.

For more information, see the section on *Expenses*.

UNIVERSITY TEST CENTER

The University Test Center administers a variety of standardized tests to candidates seeking teacher certification, graduate or professional program admission, and course credit by examination.

Services also include proctoring examinations for courses taken at other institutions and for individuals seeking to meet professional licensing or certification requirements.

until they have attempted 60 credit hours or they have completed four regular (fall or spring) semesters, whichever comes first.

In addition, the University normally makes exceptions to the residence hall requirement for full-time students who are:

• Commuting from the home where they live with their parent(s) or a member of their immediate family who is at least 21 years old, provided the one-way commuting distance does not exceed 40 miles. The University requires written verification of a student's commuting status from the parent(s)/immediate family member(s). *NOTE*: A *Request to Change to Commuter Status* form is available in the Office of Housing and Residential Programs.

• Married.

• Custodial parents.

• Twenty-one years of age or older by the beginning of the term for which an exception to the residence hall requirement is requested.

Limited on-campus housing is available for students entering his/her third year at Millersville University. Questions regarding this policy and requests for exceptions to it should be directed to the director of housing and residential programs. Details of residence hall policies and procedures are in the *Living On Campus Handbook,* available from the Office of Housing and Residential Programs, Harbold Hall.

OFF-CAMPUS LIFE

papers and a wide selection of magazines are available to borrow for reading anywhere in the building.

The SMC has nine furnished conference rooms. These rooms are widely used for weekly meetings, guest speakers and a variety of other events. The Reighard Multipurpose Room provides seating for approximately 500, and is used for film series, lectures, parties, fashion shows and dances. Reservations for conference rooms and the multipurpose room may be made at the information desk.

The banking center is located on the main level of the SMC. This area houses the banking services for registered student organizations, auditing services for student organizations and acts as the campus ticket outlet. Monthly local bus passes may be purchased and personal checks up to $50.00 may be cashed with a valid Millersville University I.D. card.

The Galley, a spacious dining area, is located in the SMC and provides students, faculty, staff and visitors with an extensive menu. On the balcony overlooking the Galley are student organization offices. Currently the Student Senate, Allies, University Activities Board, Black Student Union, Society of Latino Affairs and the International Relations Club have offices there. A computer lab across from the Galley is equipped with both PCs and MACs and is open during regular SMC hours.

The lower level of the SMC contains offices for *The Snapper* (student newspaper), *Touchstone* (student yearbook), and WIXQ (campus radio station). The Club de 'Ville is also located on the lower level. This coffeehouse environment provides a comfortable location to surf the Internet, or have lunch or a cup of Starbucks™ coffee. Frequent events include comedians, poetry slams, and Monday night football gatherings. On Friday and Saturday nights, the club turns into 'Ville After Dark, a programming alternative that includes crafts, entertainment, movies, and a midnight breakfast buffet (Saturday only).

A fitness wing is located at the south end of the SMC. It consists of a fitness center with two circuits of selectorized weight training

SPECIAL INTEREST CLUBS

Special interest clubs provide students with pre-professional activities. Accounting, art, English, dramatics, graphics, history and the human-powered submarine are some of the interests represented by clubs. Clubs that focus on social, political or environmental issues are also available.

FRATERNITIES AND SORORITIES

MU has nearly 20 Greek letter organizations, including national, local, and historically African- American fraternities and sororities, which offer something unique to each of their members. Greek Life at Millersville is full of great opportunities to meet people, develop leadership skills, give back to the community and prepare students for life after college. Members of the Greek community also benefit from the Armstrong House, also known as the Greek House, where members of the Greek community gather to study, hold meetings and host social events. Newspaper articles, magazines and research journals cite examples from people in various professions whose Greek experience helped them to choose or prosper from their chosen career path.

RELIGIOUS LIFE

Millersville University encourages students to maintain an interest in and devotion to their religious faith. Several religious organizations offer religious, social and cultural programming including: United Campus Ministry, Bible Campus Ministry, Hillel, Intervarsity Christian Fellowship, John Newman Association (Roman Catholic), University Christian Fellowship, Reformed University Fellowship and Athletes Bible Fellowship. Although not members of the University staff, Roman Catholic and Protestant ministers are employed by Catholic Campus Ministry, United Campus Ministry and University Christian Fellowship to serve the University. Both Roman

PRIVACY OF STUDENT RECORDS

The Family Educational Rights and Privacy Act of 1974, known as the Buckley Amendment, gives students the right to review their academic records, to challenge their contents and to protect their confidentiality. Basic directory information may be disclosed without prior consent of the student.

Millersville's policy on the confidentiality of student records is available from the vice president for student affairs, Washington House. Directory information is used to report student achievements in academic, athletic and extracurricular activities through appropriate media. Students may request that such information not be released by filing a written request during the first two weeks of each

1. Stealing, buying, or otherwise obtaining all or part of an unadministered test.
2. Selling or giving away all or part of an unadministered test, including answers to an unadministered test.
3. Bribing, or attempting to bribe, any other person to obtain an unadministered test or any information about the test.
4. Buying, or otherwise acquiring, another's course paper and submitting it as one's own work, whether altered or not.
5. Entering a building, office, or computer for the purpose of changing a grade in a grade book, on a test, or on other work for which a grade is given.
6. Changing, altering, or being an accessory to changing and/or altering a grade in a grade book, on a test, on a "Change of Grade" form, or other official academic University record which relates to grades.
7. Entering a building, office, or computer for the purpose of obtaining an unadministered test.
8. Continuing to work on an examination or project after the specified allotted time has elapsed.
9. Taking a test or course for someone else or permitting someone else to take a test or course in one's place.
10. Giving or taking unauthorized aid in a take home exam or paper.
11. Submitting work for a class that was already submitted for another class, when unauthorized, or allowing another student to submit or copy from your previously submitted class work.

What can students do to protect themselves from being charged with violations of the Academic Honesty Policy?

1) Prepare thoroughly for examinations and assignments; this also implies attending class on a regular basis
2) Take the initiative to prevent other students from copying your exams or assignments (e.g. shield your answer sheet during examinations; don't lend assignments to other students for them to copy and turn in).
3) Check your instructor's course syllabus for a section dealing with academic honesty for that course and information on what style sheets or standards manuals to use, etc. If you can't find such a section, ask the instructor about expectations in this area. Instructors should issue clear guidelines at the beginning of a course as to what constitutes dishonesty; ultimately, however, it is the student's responsibility to clear any uncertainties ahead of time.
4) Don't look in the direction of other student's papers during examinations.
5) Use a recognized handbook for instruction on citing source materials in papers. Consult with individual instructors or academic departments when in doubt.
6) Make use of tutorial services, or other services that may be available, to assist in preparing papers and completing other course assignments properly.
7) Discourage dishonesty among other students.
8) Refuse to assist students who cheat.

Actions which may be taken for violation of the Academic Honesty Policy.

When a faculty member suspects that an act of academic dishonesty has occurred, he/she will meet with the student to:

a) discuss the alleged act;
b) hear any defense the student may have;
c) discuss any proposed academic sanctions;
d) inform the student of his/her right to appeal faculty imposed sanctions to the department chair and/or dean of the school

Academic sanctions that may be imposed by the faculty member include:

a) a verbal reprimand;
b) a written reprimand;
c) requiring the student to redo/resubmit the assignment, test, or project;
d) lowering the grade for the assignment, test, or project.

Academic sanctions that require a formal charge be filed with the Associate Provost for Academic Administration include:

a) any sanction in excess of lowering the grade for an assignment, test ,or project;
b) failing the student for the course;
c) recommending temporary or permanent suspension from the academic major or University.

Faculty members are encouraged to submit a report for each violation of the Academic Honesty Policy to the Associate Provost for Academic Administration regardless of the academic sanction imposed or requested. If more than one (1) such report is filed for a student, even in the case of sanctions imposed only by the faculty member, then the Associate Provost for Academic Administration will meet with the student to discuss these occurrences and possibly impose additional academic sanctions.

Confidentiality

In accordance with the provisions of the Family Educational Rights and Privacy Act of 1974, any information relating to an alleged violation of the University's Student Code of Conduct or to the outcome of a judicial hearing must be treated as strictly confidential by members of the faculty.

Acade

UNDERGRADUATE PROGRAMS

Millersville offers 54 undergraduate degree programs leading to an associate or baccalaureate degree as well as minor programs. Many majors offer options for fulfilling requirements. These programs and options, subject to change, are listed on the following three pages. Teaching certification grades are given in parentheses. The specific requirements for each program are given on the following pages under the department offering the program.

** Changes to the certifications and the certification programs are anticipated at the direction of the Pennsylvania Department of Education.*

BACCALAUREATE DEGREES & OPTIONS	DEPARTMENT
Anthropology B.A. Archeology	Sociology-Anthropology
Art B.A.	Art
Art B.F.A.	Art
*Art Education B.S. Ed. (K-12)	Art
Biology B.A.	Biology
Biology B.S. Botany Environmental Biology Marine Biology Medical Technology Molecular Biology/Biotechnology Nuclear Medicine Technology Pre-Athletic Training Pre-Optometry Pre-Podiatry Respiratory Therapy	Biology
*Biology B.S.Ed. (7-12)	Biology
Business Administration B.S. Accounting Finance International Business Management Marketing	Business Admin.
Chemistry B.A. Cooperative Engineering	Chemistry
Chemistry B.S. Biochemistry Environmental Chemistry Nanotechnology Polymer Chemistry	Chemistry
*Chemistry B.S. Ed. (7-12)	Chemistry
Computer Science B.S.	Computer Science
Earth Sciences B.A. Environmental Geology	Earth Sciences
*Earth Sciences B.S.Ed. (7-12)	Earth Sciences
Economics B.A. Financial Economics Political Economy Quantitative	Economics
*Elementary Education B.S.Ed. (K-6) Early Childhood Education (N-3) Science	Elementary & Early Childhood Education
*Elementary Education B.S.Ed. (K-6) Special Education (Dual Major)	Elementary & Early Childhood Education
English B.A. Comparative Literature English as a Second Language Film Studies Linguistics Print Journalism	English

** Changes to the certifications and the certification programs are anticipated at the direction of the Pennsylvania Department of Education.*

BACCALAUREATE DEGREES & OPTIONS	DEPARTMENT
*English B.S.Ed. (7-12) Comparative Literature English as a Second Language Film Studies Linguistics Print Journalism	English
French B.A. International Business	Foreign Languages
*French B.S. Ed. (7-12) International Business	Foreign Languages
Geography B.A. Environmental Studies Geospatial Applications Global Studies	Geography
Geology B.S.	Earth Sciences
German B.A. International Business	Foreign Languages
*German B.S. Ed. (7-12) International Business	Foreign Languages
Gov't & Political Affairs B.A.	Gov't & Political Affairs
History B.A.	History
Industrial Technology B.S. Computer Aided Drafting/Design Construction Technology Electronics/Control Systems General Industrial Technology Graphic Communications Manufacturing Technology Mechanical Technology Nanofabrication Manufacturing	Industry & Technology
International Studies B.A.	(Multi-disciplinary)
Mathematics B.A. Actuarial Science Statistics	Mathematics
Mathematics B.S. Actuarial Science Applied Mathematics Statistics	Mathematics
*Mathematics B.S.Ed. (7-12) Actuarial Science Statistics	Mathematics
Meteorology B.S.	Earth Sciences
Music B.A. Music Business and Technologies	Music
*Music Education B.S.Ed. (K-12)	Music
Nursing B.S.N.	Nursing
Occupational Safety & Environmental Health B.S.	Industry &Technology
Ocean Sciences & Coastal Studies B.S. Physical Oceanography	Earth Sciences
Philosophy B.A.	Philosophy
Physics B.A. Computer Science Cooperative Engineering Meteorology Nanotechnology Philosophy Polymer Chemistry	Physics
Physics B.S.	Physics
*Physics B.S.Ed. (7-12)	Physics
Psychology B.A.	Psychology

Environmental Environmental Policy and Regulation Industrial and Environmental Health Land Use Quantitative Methods in Environmental Science Water Resources	(Multi-disciplinary)
Environmental Chemistry	Chemistry
Environmental Hazards and Emergency Management	(Multi-disciplinary)
English American Literature British Literature Film Studies General English Linguistics Print Media Studies Writing	English
French	Foreign Languages
Geography Environmental Geography General Geography Geospatial Applications Global Geography	Geography
Geology	Earth Sciences
German	

Instructional Certification:

- Art
- Biology
- Chemistry
- Early Childhood Education *(requires Elementary Certification)*
- Earth Sciences
- Elementary Education
- English
- French
- German
- Mathematics
- Music
- Physics
- Program Specialist-ESL
- Reading Specialist *(requires Instructional II Certification)*
- Social Studies/Citizenship Education
- Spanish
- Special Education
- Technology Education

Post-Baccalaureate Certification/Educational Specialist:
School Nurse

Post-Master's Certification/Educational Specialist:
School Psychology
Secondary School Counseling
Elementary School Counseling

Post-Master's Certification/Administrative:
Principal Certification K-12

Supervisory Certification Programs:
Art Education
Communication Arts *(English)*
Curriculum & Instruction K-12
Elementary Education
Foreign Languages
Mathematics
Music Education
Reading Education
School Guidance Services
School Health Services
School Psychological Services
Science
Social Studies
Special Education
Technology Education

Post-Master's Certificate:
Family Nurse Practitioner
Nursing Education

UNDERGRADUATE PROGRAMS OF STUDY

In the following course listings, G1, G2 and G3 refer to general education courses which satisfy in the liberal arts core.

G1 Course counts in Humanities and Fine Arts block

G2 Course counts in Science and Mathematics block

G3 Course counts in Social Sciences block

The symbols L, P, W, and AW indicate additional educational components contained in the course. The symbols are defined as follows:

L

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DISTANCE LEARNING FORMATS:

Online: Millerville University defines an online course as one that meets completely online via online courseware system (i.e. Blackboard, eCollege or WebCT)

Videoconference: Millersville University defines a videoconference course as one that meets in a classroom with two-way video capabilities. The course may also require online assignment/meetings.

Blended: Millersville University defines a blended course as one that requires some face-to-face class meetings along with some classes offered via distance education-either via online, videoconferencing or independent study.

ACCOUNTING

See Business Administration

ACTUARIAL SCIENCE

See Mathematics

AFRICAN-AMERICAN STUDIES

Professor Smith-Wade-El, director

African-American Studies is an 18-credit interdisciplinary minor focusing on the history and socio-culture of African Americans. The minor offers an introduction to issues, theories, and research concerning African Americans in various disciplines. Courses in the minor emphasize African-American perspectives, as well as the development of critical thinking and written and oral communication skills. The minor will present opportunities to examine, compare and contrast African-American perspectives with those of other American cultures. It offers students in a variety of disciplines important perspectives on African-American history and culture that will help them to understand the possibilities and values of cultural differences. Students will be encouraged to connect issues about African-American culture raised in the classroom to current society. Fifteen of the 18 credits satisfy general education requirements

SOCY 307: 3 s.h.
African-American Social Thought (G3, W)

SOCY 441: 3 s.h.
Urban Sociology

SOWK 313: 3 s.h.
Family Violence (P)

SOWK 350: 3 s.h.
Encounter in Human Diversity (P)

SSCI 212: 3 s.h.
T

ART

School of Humanities and Social Sciences

Vacant, chairperson.
Professors Andriulli, Kerlavage, Robinson
Associate Professors Bensur, Frischkorn, Schuller, Sigel.
Assistant Professors Barken, Bruntse, Cunningham, Mata, Wolf.

All courses are available to students enrolled in any art curriculum.

The Department of Art is an accredited institutional member of the National Association of Schools of Art and Design and offers three baccalaureate degree programs: the bachelor of arts in art (B.A.), the bachelor of science in art education (B.S.Ed.), and the bachelor of fine arts in art (B.F.A.). The recommended course sequence during the first two years for all three programs is similar, so that any change in degree program within the art department need not result in loss of time or credits.

Liberal arts, art education and fine arts degree programs are designed to offer the flexibility needed to meet the unique needs of each student. To lend authenticity to this idea, each student, with the help of an adviser, assumes much of the responsibility for determining their program of study.

B.A. and B.F.A. art students must maintain a minimum grade average of 2.0 in their major, while B.S.Ed. students must maintain a

In addition, students must take an additional 15 credits of studio art, and complete the art education foundation program (ART 221, 322, and 325); 60 total credits must be completed from the art department.

The following courses are also required: EDFN 211, 241 and EDAR 461, 462, PSYC 100 and PSYC 227, two math classes, one ENGL literature, and second ENGL class.

Fine Arts Major (B.F.A.): 126 s.h.
Foundation Courses: Students must complete the B.F.A. design-drawing foundation program: ART 142, 242, 133, 233 and 333, plus Art 312 and any three art history courses. Students will choose one course from at least five of the following seven areas: ceramics, fine art metals, painting/watercolor/drawing, photography, printmaking, sculpture and graphic design/computer art.

Concentration: Students must complete a minimum of 15 s.h. in at least one of the following studio areas: ceramics, fine arts metals, painting/watercolor/drawing, photography, printmaking, sculpture and graphic design. The concentration may include work taken to satisfy the required art courses. Students must select* art electives to bring their total art major credits to 75 s.h. During the semester in which a student anticipates completing 60-75 s.h., a second portfolio review and evaluation must be approved by the art department portfolio review committee for continuance in the B.F.A. program. Along with completion of ART 490, a senior exhibition, professional portfolio, and slides of the student's artwork are graduation requirements.

Studio Art Minor
The studio art minor is a program of study designed for the student who wishes to pursue a sequence of courses in studio art in addition to those of his/her major field. Students must complete ART 133, ART 142; select one beginning level course from the 2D or 3D studio areas; select one art history course; and select two additional art electives to complete the 18 s.h. program.**

Art History Minor
The art history minor is a program of study designed for the student who wishes to pursue a sequence of courses in art history in addition to those of his/her major field. Students must complete 18 credits in art history.

* With the approval of the student's adviser.

** A minimum of two 300 level courses must be completed to satisfy program requirements.

COURSE DESCRIPTIONS

Art History and Criticism

ART 100: 3 s.h.
Art in Culture (G1)
A course designed for the non-art major which involves a general study of the role of historic and contemporary architecture in art and in society. Criticism, analysis and evaluation of works of art are central to the course. Offered in fall, spring and periodically in the summer.

ART 201: 3 s.h.
History and Aesthetics of Photography (G1)
A survey of the history, principles and theory of photography in the 19th and 20th centuries as it is used as an aesthetic medium and for visual communication. Differentiation between photographs made as art vs. snapshots, photojournalism, scientific record and commercial art is emphasized. A research project is required. Offered periodically.

ART 301: 3 s.h.
The Ancient World (G1, W)
A survey of Western painting and sculpture from the Paleolithic through the Hellenistic periods. Offered periodically. Prereq: ENGL 110.

ART 302: 3 s.h.
The Italian Renaissance (G

ART 302: 3 s.h.
TG1, W)
A suEd sculopea(edits18(ovalthe)0th)5iodicaleriods. Offered periodically. Prereq: ENGL 110.

ART 302: 3 s.h.
TG1, W)

ART

ART 404: 321. h.CRT 404: 322.h.
CRT 404: 582. **Internet Art (G1, W)**
CRT 404: 133.h.

ART 433: 3 s.h.
Drawing IV
Advanced drawing in which individual style and technique are emphasized. An intensive course of independent research including creation of a portfolio. Prereq: ART 333. Offered periodically.

ART 533, 534: 3-6 s.h.
Drawing

Design

ART 141: 3 s.h.
Fundamentals of Studio Art (Non-Art

ART 446: 3 s.h.
Advanced Computers in Design
Offered in fall and/or spring. Prereq: ART 346

ART 447: 3 s.h.
Advanced Design II
Offered periodically.

Painting

ART 352: 3 s.h.
Painting I
An introduction to painting in oil, acrylic and related media in which the student explores basic techniques and approaches to painting through the use of drawing, design and color. Offered in fall and spring. Prereq: ART 133, 142, or permission of instructor.

ART 354: 3 s.h.
Painting II
Continued development of painting skill with the emphasis on sustained individual development and technical expression. Offered in fall and spring. Prereq: ART 352 or permission of instructor.

ART 452: 3 s.h.
Painting III
Further study in painting as the individual student works toward developing a personal idiom of expression. Offered in fall and spring. Prereq: ART 354 or permission of instructor.

ART 454: 3 s.h.
Painting IV
An advanced course in which students continue to develop style and technique as they seek their own direction in painting. Offered in fall and spring. Prereq: ART 452 or permission of instructor.

ART 552, 554: 3-6 s.h.
Painting

ART 353: 3 s.h.
Watercolor I
Introduces watercolor techniques through a series of problems related to the development of skill in handling the medium. Prereq: ART 133 and ART 142.

ART 355: 3 s.h.
Watercolor II
Continued development of painting in watercolor with the emphasis on sustained individual development and technical expression. Prereq: ART 353 or permission of instructor.

ART 453: 3 s.h.
Watercolor III
Further study in watercolor as the individual student works toward developing a personal idiom of expression. Prereq: ART 355 or permission of instructor.

ART 455: 3 s.h.
Watercolor IV
An advanced course in which students continue to develop style and technique as they seek their own direction in watercolor painting. Prereq: ART 453 or permission of instructor.

ART 553, 555: 3-6 s.h.
Watercolor and Related Media

Graphics

ART 167: 3 s.h.
Nontraditional Photography
A studio course in alternative photographic processes for the artist, photographer and craftsperson. Camera not required. Offered periodically.

ART 306: 3 s.h.
Fine Art Photography I (G1)
An introduction to the value, function and perception of fine art photography through study and practice. Student work is analyzed, criticized and evaluated in terms of the photograph as fine art. (For both non-art and art majors.) Offered in fall, spring.

ART 366: 3 s.h.
Color Photography
Introduces basic techniques and materials of color photography with an emphasis on aesthetic approaches. The course includes a survey of color reversal films, color negative films and color print materials and techniques. Prereq: ART 306 or permission of instructor. Offered in spring.

ART 406: 3 s.h.
Fine Art Photography II
Photography as a working method for the creative photographer. Color techniques and various printing processes may be chosen to suit the individual photographer's objectives. Offered in fall and spring. Prereq: ART 306 or permission of instructor.

ART 409: 3 s.h.
Advanced Fine Art Photography

ART 567: 3 s.h.
Advanced Fine Art Photography II

ART 361: 3 s.h.
Survey Printmaking

ART 469: 3 s.h
Contemporary Issues in Printmaking
Explores current trends, conceptual applications and contemporary formats surrounding printmaking. Utilizes information previously covered in any

Biology Major (B.S.): 120 s.h.
Marine Biology Option
BIOL 211, 221, 241, 263, 291 (or MS 241 offered at Marine Science Consortium), 365, 375 and 472. 21 s.h. additional biology courses. See the curriculum record form for appropriate courses for this area. Marine biology courses which must be approved by the adviser to bring total biology credits to 46. 19-20 s.h. chemistry and Earth science; 8 s.h. physics; 4 s.h. calculus.

Biology Major (B.S.): 120 s.h.
Molecular Biology/Biotechnology Option
BIOL 211, 221, 263, 365, 462, 466, 472 and 461 or 463 or 465 or 467. 3 s.h. from each area: plants & animals and population biology. Electives to bring total biology credits to 39. See the curriculum sheet for appropriate courses for each area. 24 s.h. chemistry; 8 s.h. physics; 7 s.h. mathematics/computer science including calculus.

Biology Major (B.S.): 148 s.h.
Pre-Athletic Training Option
BIOL 100, 211, 254, 255, 256, 263, 375. 16 s.h. chemistry, 8 s.h. physics, 15 s.h. Wellness & Sport Sciences (WSSD) and 38 athletic training credits earned via distance learning technologies and one summer of mandatory course work at West Chester University. Dual degree program with West Chester University. See the curriculum sheet for appropriate courses.

Biology Major (B.S.): 120 s.h.
Mng Tpo.Major (B.S.): 120 s.h.
Mng Tpo.S

BIOL 103: 3 s.h.
The Science of Evolution (G2)
Evolutionary theory through an integrated perspective of both biology and geology. No credit for biology and earth science majors. Prereq: 15 credit hours recommended. Offered infrequently.

BIOL 108/108H: 1 s.h.
Honors Freshman Biology Seminar
Emphasis on the intellectual and historical context of the core ideas of BIOL 100 and an in-depth exploration of ideas raised in lecture and laboratory. Satisfies the honors lab when taken with Biology 100. 1 hr. seminar. Offered in fall, spring. Prereq or coreq: BIOL 100.

BIOL 204: 3 s.h.
Human Biology (G2, W)
A non-laboratory course in human biology designed specifically for those students planning to specialize in social work, psychology or related fields. An overview of the changes that take place in the course of a human lifetime; basics of human evolution, ecology, behavior, anatomy and physiology of the human organism are discussed. 3 hrs. lec. Offered fall, spring. Prereq: BIOL 100, demonstrated competency or permission of instructor and ENGL 110. No credit toward BIOL major.

BIOL 205: 3 s.h.
Heredity and Human Affairs (G2)
Genetics for non-majors with reference to human heredity and development. The social implications of recent advances in genetics are considered. 3 hrs. lec. Offered periodically. Prereq: BIOL. 100, demonstrated competency, permission of instructor or RN. No credit toward BIOL major.

BIOL 207: 3 s.h.
Human Sexuality (G2, W)
Study of the nature of human sexuality, particularly as it relates to biological phenomena. Discussions and films will cover the biology of human reproduction, biology of human sexual behavior and its implications. 3 hrs. lec. Offered periodically. Prereq: BIOL 100, demonstrated competency, permission of instructor or RN, and ENGL 110. No credit toward BIOL major.

BIOL 208: 3 s.h.
Plants and People (G2)
Explores uses of plants and plant products by man and their impact on the development of civilization. Characteristics of plants that make them suitable for food, shelter, clothing, energy, medicines, entertainment, objects of worship, microclimate modification and aesthetic objects are discussed. 3 hrs. lec. Offered periodically. Prereq: BIOL 100, demonstrated competency or permission of instructor. No credit toward BIOL major.

BIOL 211: 4 s.h.
Concepts of Zoology (G2, L)
Study of invertebrate and vertebrate animals. Classification, reproduction, development, ecology, physiology, behavior, genetics, scientific methodology (incar ())ifincar u Thosum3rienti)02- ge)02ge)0ge)0ge)0ge)0

BIOL 247: 3 s.h.
Biodiversity: Origins and Extinctions (G2)
Existing patterns of biological diversity (biodiversity), the processes and events that produce biodiversity, and the natural and unnatural factors that limit and/or reduce biodiversity. The ethics of biodiversity are also discussed. 3 hrs. lec. Offered periodically. Prereq: BIOL 100 or demonstrated competency and COMM 100. No credit toward BIOL major.

BIOL 254: 4 s.h.
Human Anatomy and Physiology I
Study of the structure and function of the human body. This first semester of a two-semester sequence deals with the development, histology, gross anatomy, function and pathophysiology of the cutaneous, skeletal, muscular and nervous systems. 3 hrs. lec., 3 hrs. lab. Offered in fall. Prereq: BIOL 100 or demonstrated competency.

BIOL 255: 4 s.h.
Human Anatomy and Physiology II
Study of the structure and function of the human body. This second semester of a two-semester sequence deals with the development, histology, gross anatomy, function and pathophysiology of the endocrine, circulatory, respiratory, digestive, urinary, and reproductive systems. 3 hrs. lec., 3 hrs. lab. Offered in spring. Prereq: BIOL 254.

BIOL 256: 3 s.h.
Nutrition (G2, W)
Principles of adequate nutrition including digestion and metabolism of foods; energy, protein, mineral and vitamin needs; environmental and industrial contaminants, additives and carcinogens; dietary treatment for nutritional disorders. 3 hrs. lec. Offered in fall, spring. Prereq: ENGL 110.

BIOL 257: 1 s.h.
Introduction to Allied Health Professions
A survey of the various disciplines in the allied health field. Describes the type of training offered by hospitals for students who are planning to major in a health profession and for students who are undecided on a career. 1 hr. lec. Offered in fall.

BIOL 263: 4 s.h.
Cell Biology (G2,

BIOL

BIOL 325: 3 s.h.
Plant Systematics
A survey of local vascular flora, use of dichotomous keys in identifying plants, distinguishing features of common plant families, principles of plant systematics. Phylogenetic, biosystematic and nomenclatural concepts are considered. 2 hrs. lec., 3 hrs. lab. Offered in fall. Prereq: BIOL 221.

BIOL 326: 3 s.h.
Lower Plants
The structure, life histories and evolution of algae, bryophytes and the vascular cryptogams. Notes are made of their distribution, physiological peculiarities and pathogenicity or usefulness to people. 2 hrs. lec., 3 hrs. lab. Offered infrequently. Prereq: BIOL 221.

BIOL 327: 3 s.h.
Horticultural Science

BIOL 417: 3 s.h.
Parasitology
Biology of parasites and their host/parasite relationships are considered. Parasites infesting humans and domestic animals stressed. Includes practical aspects of diagnosis. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: BIOL 211. BIOL 263 recommended.

BIOL 424: 3 s.h.
Mycology
The taxonomy, morphology, physiology and ecology of fungi. Laboratory activities include surveys of local populations of fleshy fungi, fungal pathogens of plants and soil fungi; physiological studies on growth and reproduction; experimental studies of fungal ecology; and studies of comparative morphology of diverse fungal groups. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: BIOL 221 and 263.

BIOL 427: 3 s.h.
Developmental Plant Anatomy
Structure and function of cells, tissues and organs constituting the plant body. Developmental aspects such as cellular differentiation and organogenesis are used to enhance the understanding of plant structure and its variability. Investigations of plants in the laboratory and greenhouses including microtechniques, theory and application of light microscopy and basic photomicrography. 2 hrs. lec., 3 hrs. lab. Offered in fall. Prereq: 221. BIOL 263 recommended.

BIOL 428: 3 s.h.
Plant Morphogenesis
Concepts of plant growth and development utilizing vascular and non-vascular plants. Includes developmental topics such as regeneration, cell production, polarity, correlative growth, developmental genetics, totipotency and integration. Laboratories stress experimental design and include microscopy, cell and tissue culture, cyto-histological techniques. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: BIOL 221, 263, 365 and CHEM 235 or 231.

BIOL 435: 3 s.h.
Animal Physiology
Structure and functions of animals. Independent investigation and recent physiological theories emphasized. 2 hrs. lec., 3 hrs. lab. Offered in fall. Prereq: BIOL 211 and 263; CHEM 112 and 235 or 231.

BIOL 436: 3 s.h.
Plant Physiology
Life processes of plants. Water relations, nutrition, translocation, photosynthesis, metabolism, growth, development and reproduction will be considered with particular reference to higher plants. 2 hrs. lec., 3 hrs. lab. Offered in spring. Prereq: BIOL 221 and 263. CHEM 231 or 235 recommended.

BIOL 437: 3 s.h.
Endocrinology
The role of hormones in the integration and control of physiological and developmental process is stressed as well as the molecular mechanism of hormone action. 3 hrs. lec. Offered in fall. Prereq: BIOL 263.

BIOL 438: 3 s.h.
Neurobiology (W)
The structure and function of the nervous system. Lecture and laboratories will cover a broad range of topics, from the molecular to the cognitive. One of the major themes is the relationship between the brain and behavior. 2 hrs. lec., 3 hrs. lab. Offered in spring. Prereq: BIOL 263 and ENGL 110.

BIOL 443: 3 s.h.
Conservation Biology
Population ecology and genetics applied to the conservation of rare, threatened and endangered species. Emphasis on the regulation of abundance, theoretical models of population dynamics, experimental design, sampling approaches and case studies. 2 hrs. lec., 3 hrs. lab. Offered annually (usually in fall). Prereq: BIOL 211, 221, 241, 242 and 375.

BIOL 445: 3 s.h.
Aquatic Biology
Study of the physical and biotic aspects of temporary pools, streams, ponds and rivers. Field trips. 2 hrs. lec., 3 hrs. lab. Offered in spring. Prereq: BIOL 211, 221; PHYS 132 or 232 desirable.

BIOL 446: 3 s.h.
Ecosystems (W)
Ecosystem processes including nutrient cycles, energy budgets and trophodynamics are discussed for terrestrial, coastal and marine ecosystems. Processes are discussed for ecosystem types such as those controlled by fire, volcanism, chemosynthetic bacteria, detrital food resources, herbivory and predation. Ecosystems viewed in a global perspective to understand global carbon and nutrient cycles. 3 hrs. lec./discussion. Offered in spring of even years. Prereq: BIOL 211, 221, 241, and 375 and ENGL 110. Prereq or coreq: BIOL 242.

BIOL 447: 4 s.h.
Chesapeake Bay System (W)
Study of the effects of human activity on the ecosystems of the Chesapeake Bay System and the role of ecological principles in current restoration efforts. Investigation of how agricultural practices, riparian forests, tidal and nontidal wetlands and urban development affect the input of nutrients and toxins, and the estuarine processes in Chesapeake Bay that cause eutrophication and population declines in fisheries. 2 hrs. lec., 4 hrs. lab/field. Offered in fall. Prereq: BIOL 241 and ENGL 110.

BIOL 448: 2 s.h.
Biological Problems of Environmental Management

BIOL 449: 4 s.h.
Plant Communities
Plant population ecology is integrated with plant population genetics in an endeavor to understand effective approaches in ecological restoration. An exercise in how to sample, assess, model and evaluate health of plant communities. 3 hr. lec., 3 hr. lab. Offered infrequently. Prereq: BIOL 242 and MATH 235 or BIOL 375 or equivalent; BIOL 325 and 365 recommended.

BIOL 454: 2 s.h.
Immunology
The development of humoral and cellular immunity to an antigenic stimulus is discussed. Role of these mechanisms in immunogenetics, immunologically mediated disease, immunological protection against infectious agents and cancer also considered. 2 hrs. lec. Offered in spring. Prereq: BIOL 263.

BIOL 455: 3 s.h.
Cardiopulmonary Physiology
Cardiovascular and pulmonary function. Covers heart muscle, electro-mechanical properties of the heart, hemodynamics, mechanics of ventilation, gas transport and cardiopulmonary insufficiencies. Laboratory exercises include use of human subjects, animal experimentation and computer simulations. 2 hrs. lec., 3 hrs. lab. Offered in spring. Prereq: BIOL 211, 263, 356. CHEM 231 or 235.

BIOL 461: 3 s.h.
General Microbiology
The structure, physiology and ecology of microorganisms. Symbiotic associations between organisms will be examined in depth. Principles of microbial virulence and immunology are also discussed. Laboratory investigations include the isolation and identification of unknown microorganisms. 2 hrs. lec., 3 hrs. lab. Offered in fall. Prereq: BIOL 263.

BIOL 462: 4 s.h.
Molecular Biology (W)
The molecular and macromolecular basis of life. The structure and function of cellular macromolecules, molecular techniques of genetic analysis and the control of cellular processes will be examined in depth. 3 hrs. lec., 3 hrs. lab. Offered in fall. Prereq: BIOL 365 and ENGL 110. BIOL 461 or CHEM 326 recommended.

BIOL 463: 4 s.h.
Virology
Comprehensive investigation of animal viruses. In-depth analysis of virus particles, modes of replication, epidemiology of virus infection, virus host interactions and vaccines. Focus is on medically important viruses such as herpes, influenza, hepatitis and human immunodeficiency viruses. Laboratory exercises include the culture and analysis of viruses in bacterial and mammalian systems. 3 hrs. lec., 3 hrs. lab. Offered in fall. Prereq: 263; BIOL 365 recommended.

BIOL 465: 3 s.h.
Developmental Biology
Principles of development and differentiation in animals and plants at the molecular and supramolecular levels of organization. The laboratory includes both experimental and descriptive embryology. 2 hrs. lec., 3 hrs. lab. Offered in spring. Prereq: BIOL 211, 221 and 263 or permission of instructor.

BIOL 466: 3 s.h.
Molecular and Cellular Techniques
Application and theory of techniques commonly used in biotechnology, cell and molecular biolog(R3chnology9mnt)-R3chn-ei23 moleumIOL 476: 3 s.h.

BIOL 70: 1-13 s.4.

BIOL 473: 1 s.h.
Seminar-Methods of Teaching Biological Issues in the Secondary School
A seminar for prospective life science teachers to consider methods a teacher might employ to present controversial aspects of biology in intellectually honest, balanced ways which also demonstrate sensitivity to the various moral, ethical and political dilemmas secondary school students may encounter. 1 hr. lecture. Offered annually. Co- or prereq: EDSE 435; required of all B.S. Ed./BIOL students prior to or with EDSE 461.

BIOL 485: 3 s.h.
Animal Behavior

Respiratory Therapy

The following courses are offered as needed for students in the clinical phase of the respiratory therapy program.

RESP 410: 2 s.h.
Acute C

RESP 424: 2 s.h.
Non-Infectious Diseases

BUSINESS ADMINISTRATION

School of Humanities and Social Sciences

Professor Ellis, chairperson
Professors Brady, Frazer, Ghoreishi, Nakhai
Associate Professors Blazer, Galante, Guo, Leinberger, McCaskey
Assistant Professors Dillon, Dutta, Kabongo, Kim, Zhang

The Department of Business Administration is nationally accredited by the Association of Collegiate Business Schools and Programs to offer the bachelor of science (B.S.) in business administration with options in accounting, finance, international business, management and marketing. The curriculum is designed to provide study in the subjects required for employment in any business or organization. The Department of Business Administration has a diverse faculty with extensive academic training and business experience.

The curriculum also provides excellent preparation for graduate and professional studies leading to degrees such as the M.B.A., M.S., Ph.D. and the J.D. Accounting students have available all the necessary course work to sit for either the CPA or CMA, CIA, or the CFE examination.

The curriculum is flexible enough to permit internships and cooperative education with local industry. Minor study can also be incorporated. Studies in disciplines outside business are required to help develop the well-rounded and liberally educated person employers seek.

Management: BUAD 251, and 12 credits in management.
Marketing: BUAD 231, 431, 436 and 6 credits in marketing.
NOTE: Some of these courses have prerequisites.

COURSE DESCRIPTIONS

General Business

Finance

BUAD 143: 3 s.h.
Personal Financial Planning
Theoretical tools of economics and business management are applied to personal financial planning and management. Topics include financial planning, consumer credit, budgeting, insurance, retirement and estate planning. Offered infrequently. Does not count in any business administration option, but can count as BUAD elective.

BUAD 341: 3 s.h
Managerial Finance I (W)
Fundamental topics in corporate finance, including: use of financial statements, time value of money, capital budgeting and working capital management. Offered in fall, spring. Prereq: ECON 102, C- or higher in BUAD 162 for BUAD majors/minors and ENGL 110.

BUAD 342: 3 s.h.
Managerial Finance II
Advanced topics in corporate finance, including risk analysis of operating and financial decisions, capital budgeting and cash flow analysis. Offered fall, spring. Prereq: C- or higher in BUAD 341 for BUAD majors/minors, MATH 235, and BUAD 306 or ECON 332 or ECON 333.

BUAD 343: 3 s.h.
Real Estate Fundamentals
Introduces special characteristics of real estate and how real estate decisions are made. Includes real estate terms, laws, commercial and residential markets, and property valuation. Prereq: C- or higher in BUAD 341 for BUAD majors/minors. Offered periodically.

BUAD 344: 3 s.h.
International Finance
The international financial environment and a comprehensive analysis of foreign exchange rates and instruments. Topics include the international monetary system, balance of payments, contemporary currency trading and quotation, forward contracts, international parity conditions and foreign currency options. Offered annually. Prereq: C- or higher in BUAD 341 for BUAD majors/minors.

BUAD 345: 3 s.h.
Investment Analysis
Analysis of investment objectives (Anio34uuncptioding)13(of)13(capital)13(marketf)13(including)13(markeg)13(trading)13nstratgives (Anio34techniqueis)13(

BUAD 365: 3 s.h.

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BUAD 352: 3 s.h.
Human Resource Management
Survey course familiarizes students with the human resource function. Topics include recruitment, orientation, training, compensation, safety, performance evaluation and labor relations. Offered in fall, spring. Prereq: C- higher in BUAD 251 for BUAD majors/minors.

BUAD 353: 3 s.h.
Labor-Management Relations
Course covers roles of management and labor unions using an analytical framework for labor relations problems, contract negotiations and administration. Offered periodically. Prereq: C- or higher in BUAD 251 for BUAD majors/minors.

BUAD 354: 3 s.h.
Compensation Management
Specific focus on methods for determining wages. Salaries, incentive payments, point classification and factor comparison systems are discussed in detail. Management of benefits, including hospitalization, major medical, life insurance, long-term disability and pension administration is emphasized. Offered periodically. Prereq: BUAD 352.

BUAD 355: 3 s.h.
Business and Society (G3)

BUAD 333: 3 s.h.
Personal Selling
Covers skills and knowledge required of sales representatives to understand customers' needs and make effective presentations. Includes prospecting and contacting customers, making presentations, handling objections, closing the sale and developing long-term relationships. Emphasis on individual role-play and group presentations. Offered annually. Prereq: C- or better in BUAD 231 for BUAD majors/minors and 60 credits.

BUAD 335: 3 s.h.
Advertising
Economic and social roles of advertising in a contemporary business setting. Emphasis on the creation, development, implementation and evaluation of advertising campaigns through the analysis of creative processes, managerial techniques, media resources, budgeting methods and the concept of social responsibility. Offered annually. Prereq: C- or better in BUAD 231 for BUAD majors/minors.

BUAD 336: 3 s.h.
Retail Marketing
The role of retail institutions in the marketing system. Emphasis on strategy development in the retailing context. Offered infrequently. Prereq: C- or better in BUAD 231 for BUAD majors/minors.

BUAD 337: 3 s.h.
Sales Force Administration
Planning, direction and control of the sales force. Includes recruiting, selecting, training, supervising, compensating, motivating and evaluating sales representatives. Emphasis on acquisition of basic sales and managerial skills. Offered annually. Prereq: C- or better in BUAD 231 for BUAD majors/minors.

BUAD 431: 3 s.h.
Marketing Research
Research theory and techniques used in marketing activities. Stresses formulation of research objectives, instrument design, sample selection, data collection, statistical analysis, computer applications and report writing for managerial use. Offered fall, spring. Prereq: MATH 235, C- or higher in BUAD 231 for BUAD majors/minors.

BUAD 435: 3 s.h.
International Marketing
The development of marketing strategy for entering and competing with businesses in foreign countries. Uniqueness of foreign markets and their impact on the marketing manager's decision-making processes are examined. Offered annually. Prereq: C- or higher in BUAD 231 for BUAD majors/minors.

BUAD 436: 3 s.h.
Marketing Strategy
Analysis of opportunities and problems confronting the marketing manager in decision making. Includes market segmentation, target marketing, positioning, market research, product life cycle strategies, marketing mix implementation and social responsibility. Emphasis on case analysis to bridge the gap between marketing theory and application. Offered annually. Prereq: BUAD 431, and 90 credits.

CHEMISTRY

School of Science and Mathematics

Professor Turchi, chairperson
Professors Hill, Iannone, Rajaseelan, Rickard, Wismer
Associate Professors Anna, Mbindyo, Shepherd
Assistant Professors Bonser, Miller, Schiza
Instructor C. Greco

The Department of Chemistry, accredited by the American Chemical Society, offers three degree programs leading to the baccalaureate degree with a major in chemistry. The recommended course sequence during the first year is identical for the three programs and thereafter differs only slightly through the junior year; thus a change in career emphasis in chemistry need not delay graduation.

The bachelor of science degree (B.S.) offers intensive training in chemistry and mathematics and is designed specifically for students who wish to pursue graduate studies or employment as a chemist. There are three options available within the B.S. degree program. The first option, in biochemistry, provides study in the chemistry of life processes. This program offers the best preparation for acceptance to medical schools. Completion of the requirements for either of these degree programs leads to certification of the graduate by the department to the American Chemical Society, which offers immediate membership eligibility in ACS as well as more desirable employment opportunities. The second option, in environmental chemistry, provides study in areas that involve the traditional chemistry of the atmosphere, hydrosphere, geosphere and biosphere. The third option is in polymer chemistry. Polymer chemistry forms the basis for the production of plastics, synthetic fibers, paints, coatings, adhesives and many other chemical products.

The bachelor of arts degree (B.A.) is a more versatile program, combining a solid foundation in chemistry with an ample opportunity for breadth of study. Students electing this degree have found it to be sound preparation for further study or a career in chemistry. It invites interdisciplinary studies in areas such as environmental science, geochemistry, oceanography and chemical physics and provides the breadth and depth of pre-professional training necessary for subsequent study in, for example, law or medicine.

For those students desirous of pursuing a career in high school teaching, the bachelor of science in education degree (B.S.Ed.) provides a sound background in chemistry as well as the necessary methods courses.

An important program option in chemistry is cooperative education. Applicable to any of the above degree options, cooperative

education offers students invaluable experience in a job related to their career goal as well as financial remuneration, which helps significantly to defray the expenses of college study. Beginning after the freshman year, students choosing this option may alternate periods of on-campus study with off-campus employment until graduation. In addition, up to three credits may be approved to count toward major sequence requirements for each co-op experience and up to six credits may be counted toward degree requirements. For more information, see *Cooperative Education in the Special Academic Opportunities* section.

The chemistry-3/2 cooperative engineering option within the B.A. program requires three years of study as a chemistry major in the Millersville University liberal arts curriculum with two years of residence in the chemical engineering program at Pennsylvania State University. At the end of five years, the student receives two baccalaureate degrees: a B.A. in chemistry from Millersville and a B.S. in chemical engineering from the cooperating engineering school.

The associate of science degree (A.S.) offers two programs of study. The associate of science in chemistry is a two-year program designed to train students for technical positions in the chemical industry. The associate of science pre-pharmacy option is also a two-year program designed for those students who are interested in a career in pharmacy. These students graduate with a two-year degree from Millersville and then continue on with their studies in pharmacy school.

In an effort to ensure that each student is properly placed, the department administers chemistry placement tests to all new students during their respective orientation programs.

COURSE REQUIREMENTS

Chemistry Majors (B.S.): 120 s.h.
55 s.h. in chemistry: CHEM 111, 112, 188, 231, 232, 251, 265, 326, 341, 342, 391, 392, 452, 465, 487, 488, 498 (1) plus 8 s.h. minimum from CHEM 324, 327, 328, 375, 381, 435, 476, 482, 486, 498, 499, COOP 300, 400. Required related courses: MATH 161, 211, 311 and PHYS 231, 232 plus 4 credits in computer science, mathematics and/or physics.

It is strongly recommended that students pursuing the bachelor of science degree achieve competency equivalent to the first two courses in a foreign language. A course in economics is also recommended.

Chemistry Major (B.S.): 120 s.h.
Biochemistry Option
47 s.h. in chemistry: CHEM 111, 112, 188, 231, 232, 251, 265, 326, 327, 328, 341, 342, 465, 487, 488, 498 (1), plus 2 s.h. minimum selected from CHEM 324, 381, 375, 391, 392*, 435, 452, 476, 482, 486, 498, 499, COOP 300, 400. Required related courses: competency equivalent to BIOL 100, plus BIOL 263 and two of BIOL 365, 461, 462; MATH 161, 211, 311 and PHYS 231, 232.

*This elective must be completed to gain ACS certification in biochemistry.

It is strongly recommended that students pursuing the bachelor of science degree achieve competency equivalent to the first two courses in a foreign language. A course in economics is also recommended.

Chemistry Major (B.S.): 120 s.h.
Environmental Option
46 s.h. in chemistry: CHEM 111, 112, 188, 231, 232, 251, 265, 375, 341, 342, 465, 476, 487, 488, 498 (1) plus 4 s.h. minimum selected from CHEM 324, 326, 327, 328, 381, 391, 392, 435, 452, 486, 498, 499; COOP 300, 400. Required related courses: competency equivalent to BIOL 100, plus MATH 161, 211, 311 and PHYS 231, 232. Additional electives (9 s.h.) selected from BIOL 241, ESCI 245, 349, 426, GEOG 202, OSEH 321.

Chemistry Major (B.S.): 120 s.h.
Nanotechnology Option
37 credits in chemistry, CHEM 111, 112, 188, 231, 232, 251, 265, 302, 341, 342, 498, plus 4 s.h. selected from CHEM 326, 375 or 381. Required related courses: 12 credits MATH 161, 211, 311; Physics, 10 credits PHYS 231, 232; Professional block at Penn State (18 s.h.).

Chemistry Major (B.S.): 120 s.h.

Chemistry Major (A.S.): 60 s.h.
23-24 s.h. in chemistry: CHEM 111, 112, 231, 232, 265 plus one elective. Required related courses: PHYS 131 (or 231), 132 (or 232); MATH 161 (or 160).

Chemistry Major (A.S.) 60 s.h.
Pre-Pharmacy Option
20 s.h. in chemistry: CHEM 111, 112, 231, 232, 265. 19 s.h. of required related courses in mathematics, physics and biology; and 21 s.h. of General Education courses. Chemistry students aspiring to attend a pharmacy program would be advised to take an economics course and either a psychology or sociology course as G3 electives. These courses are highly recommended to satisfy pre-requisite admission requirements at many pharmacy programs.

It is strongly recommended that students pursuing any of the degrees in chemistry elect an appropriate course in computer science.

Chemistry majors are required to have a grade of C (2.0 quality points) or higher in chemistry courses required for the major at the 100 and 200 level before proceeding to a course for which it is a prerequisite. Currently, these courses include: CHEM 111, 112, 231, 232, 251, and 265.

Chemistry Minor: 20 s.h.
20 s.h. in chemistry: CHEM 111, 112, 265; and CHEM 231 and 232, or CHEM 341 and 342, or CHEM 235 plus one elective from CHEM 326, 375.

Biochemistry Minor: 25 s.h.
25 s.h. in chemistry: CHEM 111, 112, 231, 232, 326, 324 or 327, 328.

Environmental Chemistry Minor: 20-24 s.h.
Required courses: CHEM 111, 112, 375, 476 and CHEM 231, 232 or 235. Recommended courses: CHEM 265.

COURSE DESCRIPTIONS

CHEM 101: 3 s.h.
Chemistry! Better Things for Better Living (G2)
A brief introduction to chemistry and its uses in modern society: consumer, environmental, and industrial application. Presented in a mostly descriptive fashion. No credit toward chemistry major. 3 hrs. lec. Offered in fall.

CHEM 102: 3 s.h.
The Science of Chemistry (G2, L)
An investigation of chemical reactions that are: encountered in everyday living, present in living systems, the basis of societal issues, the foundation of producing new materials, and used to modify materials into finished products. No credit toward chemistry major. 2 hrs. lec., 2 hrs. lab. Offered in spring.

CHEM 103: 3 s.h.
General, Organic and Biochemistry I (G2, L)
An introduction to the basic theories of general and organic chemistry including nomenclature, reactions, and problem solving. Appropriate for nonscience majors and satisfies general education requirements. Proficiency in algebra is essential. High school chemistry or CHEM 110 is required. 2 hrs. lec., 2 hrs. lab. Offered fall, summer.

CHEM 104: 3 s.h.
General, Organic and Biochemistry II (G2, L)
Solutions, acids and bases, oxidation-reduction, and organic chemistry; including nomenclature and basic reactions with relevancy to biochemistry. Appropriate for nonscience majors and satisfies general education requirements. 2 hrs. lec., 2 hrs. lab. Prereq: CHEM 103. Offered in spring.

CHEM 110: 3 s.h.
Fundamentals of Chemistry
An intensive review of the fundamentals of chemistry, with particular emphasis placed on solving chemistry problems. Topics include: measurements, formulas and nomenclature, equations, stoichiometry, atomic and molecular structure, solution concentrations, acids and bases. This course is designed to prepare students majoring in the sciences for their general chemistry sequence, CHEM 111 and CHEM 112. This course may be counted only as an elective beyond normal graduation requirements. Placement in CHEM 110 on the basis of placement examination before registration. 3 hrs. lec./problem solving. Offered fall, spring and online in summer.

CHEM 111: 4 s.h.
Introductory Chemistry I (G2, L)
The properties and theories of the solid, liquid and gaseous states of matter, the stoichiometry and thermochemistry of chemical reactions, and theories and applications of molecular structure and bonding. Proficiency in algebra is essential. High school chemistry is strongly recommended. Intended for science majors: biology, chemistry, earth sciences, physics. 3 hrs. lec., 1 hr. discussion, 2 hrs. lab. Prereq: C- grade or higher in CHEM 110, or satisfactory score on the Chemistry Placement Test (CPT) before registration, or permission of chair.

CHEM 112: 4 s.h.
Introductory Chemistry II (G2, L)
Continuation of CHEM 111. The interactions of matter and energy-thermodynamics, kinetics and electrochemistry. Equlibria in aqueous systems-theory and practice. Coordination chemistry and descriptive chemistry of the elements. 3 hrs. lec., 1 hr. discussion, 2 hrs. lab. Prereq: CHEM 111 with a grade of C- or higher; C for chemistry majors.

CHEM 113H: 1 s.h.
Honors Seminar for Introductory Chemistry
The ideas of introductory chemistry are studied in extended depth, using problems, laboratory exercises, readings and discussion. Grades of B- or better in both CHEM 112 and CHEM 113 will result in honors designation for the pair. The pair of courses counts as one entry in the science

component of general education and results in 5 hours of general education credit. 1 hr. discussion. Corequisite: concurrent registration in CHEM 112 is required. Prereq: CHEM 111 grade B- or better and consent of Honors College Committee.

CHEM 188: 1 s.h.
Freshman Seminar in Chemistry
An orientation to the opportunities and services available to chemistry students in the university and professional environments. Students will develop a better understanding of the major and career options and will be introduced to the chemistry department faculty and programs. 1 hr. discussion. Required of all freshman chemistry majors. Recommended for transfer students. Offered in fall.

CHEM 205: 4 s.h.
The Molecular Basis of Color and Form-Chemistry in Art (G2, L)
Artists and chemists are both interested in the topics of color and form. In this course, color and form will provide the focus for students to investigate, through a variety of lecture, laboratory, and studio activities, the scientific basis of such topics as paints, clays and glazes, metalworking, photography, dyes and fabrics, polymeric materials, art preservation and restoration and chemical hazards in art. Knowledge of high school chemistry or equivalent is assumed. 3 hrs. lec., 3 hrs. lab. Offered in spring.

CHEM 231: 4 s.h.
Organic Chemistry I (G2, L)
Organic structural theory including conformations and configurations of molecules and functional group classification of organic compounds-alkanes, alkenes, alcohols, ethers, alkyl halides, aldehydes and ketones, aromatic and organometallic compounds. Major emphasis on relationships among molecular structure, chemical reactivity and physical properties. Thorough integration of reaction mechanisms as elucidated using principles of kinetics, thermodynamics, stereochemistry and spectroscopy. Introduction to the instrumentation of organic chemistry: proton and carbon-13 nmr, infrared and mass spectrometry. 3 hrs. lec., 3 hrs. lab. Prereq: CHEM 112 with a grade of C- or higher; C for chemistry majors.

CHEM 232: 4 s.h.
Organic Chemistry II (G2, L)
The structure-property-reactivity-mechanism-synthesis approach from CHEM 231 continues with application to, and/or emphasis on, unsaturated compounds-alkynes, dienes and aromatic compounds. Also carbonyl compounds including carboxylic acids and derivatives; along with amines, phenols, and complex compounds with multiple functionality. Introduction to natural and synthetic polymers; biomolecules including fats, oils, amino acids, and carbohydrates, along with the basic reactions of metabolism. Thorough integration of structural relationships to spectral properties using uv, ir, C-13 and H-1 nmr, and mass spectral instrumentation and derived data. 3 hrs. lec., 3 hrs. lab. Prereq: CHEM 231 with a grade of C- or higher.

CHEM 235: 4 s.h.
Short Course in Organic Chemistry
The elementary theory, reactions, and properties of organic compounds in an integrated fashion. No credit toward chemistry major. 3 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: CHEM 112 with a grade of C- or higher; C for chemistry majors. CHEM 235 is not an acceptable Prereq. for CHEM 232.

CHEM 251: 3 s.h.
Inorganic Chemistry I

of fats, carbohydrates, lipids, proteins, nucleic acids and other macromolecules. Photosynthesis, electron transport phosphorylation and replication mechanisms also presented in detail. 3 hrs. lec., 3 hrs. lab. Offered in spring. Prereq: CHEM 232 and 326.

CHEM 328: 1 s.h.
Analytical Biochemistry Laboratory
Introduction to biochemistry literature research, methodology of enzyme assays and peptide synthesis, and techniques used for separation, analysis and characterization of all major classes of biologically important compounds. 3 hrs. lab. Offered in spring. Prereq or Coreq: CHEM 327.

CHEM 341: 4 s.h.
Physical Chemistry I (W)
A thermodynamic study of chemical systems including ideal and nonideal solutions, chemical and phase equilibria, and electro-chemistry. Investigation of the macroscopic behavior of gases and its theoretical explanations. Summary of the determination and application of additive properties. 3 hrs. lec., 3 hrs. lab. Offered in fall. Prereq: CHEM 265, PHYS 232, MATH 311 and ENGL 110.

CHEM 342: 4 s.h.
Physical Chemistry II (W)
Chemical kinetics, statistical mechanics, the development and present state of quantum theory including chemical bonding theories, atomic and molecular spectroscopy, and methods of structure determination. 3 hrs. lec., 3 hrs. lab. Offered in spring. Prereq: CHEM 341, and ENGL 110.

CHEM 372/372H: 3 s.h.
The History of Chemistry and Society (P)
The history of the development of the science of chemistry from its roots in Egyptian and Greek societies through its specialization in the early twentieth century. The relationships between chemical developments and society are explored, as well as the influences of chemistry on Western thought. 3 hrs. discussion. Offered in spring. Prereq: ENGL 110; junior status; CHEM 102, 104, or 111; 2 social science courses, including one history course: HIST 101, 102, or 410 preferred.

CHEM 375: 4 s.h.
Environmental Chemistry (G2, L)
The application of modern chemical principles to the chemical and physical interactions among the hydrosphere, lithosphere, atmosphere and biosphere. Also discussed are the more recent topics in the areas of pollution, energy and waste control. (The laboratory covers the current, fundamental instrumental methods and techniques encountered in environmental analysis.) 3 hrs. lec., 3 hrs. lab. Offered fall. Prereq: CHEM 112 with a grade of C- or higher.

CHEM 381: 4 s.h.
Polymer Chemistry I
An introduction to polymer chemistry. Covered are nomenclature, solutions and solubility, molecular weight determination, morphology, structure determination, polymerization reactions and synthetic methods, physical properties and fabrication methods. The laboratory provides an introduction to the methods of polymer synthesis and characterization. 3 hrs. lec., 3 hrs. lab. Offered in fall. Prereq: CHEM 232 or permission of instructor.

CHEM 391: 1 s.h.
Advanced Laboratory I
Application of advanced techniques in organic synthesis including chemical and physical methods of separation with major emphasis on advanced spectroscopic methods of characterizing organic compounds. 3 hrs. lab. Offered in fall. Prereq: CHEM 265, 232.

CHEM 392: 1 s.h.
Advanced Laboratory II
A continuation of CHEM 391 including advanced techniques in inorganic synthesis and analysis. 3 hrs. lab. Offered in spring. Prereq or Coreq: CHEM 251.

CHEM 435: 3 s.h.
Advanced Organic Chemistry
Current theories of organic chemistry with major emphasis on physical aspects as applied to structure, reactions, spectroscopy and reaction mechanisms. 3 hrs. lec. and reading in current literature. Offered in spring. Prereq: CHEM 232.

CHEM 452: 3 s.h.
Inorganic Chemistry
Theories of bonding and structure of inorganic elements and compounds, acid-base theories, coordination chemistry, organometallic chemistry, bioinorganic chemistry. 3 hrs. lec. Offered in fall. Prereq: CHEM 251 and 342 or permission of instructor.

CHEM 465: 4 s.h.
Analytical Chemistry
Theory and practice of modern analytical techniques in chemical separations and instrumental analysis. 3 hrs. lec., 3 hrs. lab. Offered in spring. Prereq or Coreq: CHEM 342.

CHEM 476: 4 s.h.
Environmental Chemistry II
Extension of the principle topics covered in CHEM 375 with emphasis on quantitative aspects of topics such as the ozone layer, potential greenhouse effects, tropospheric chemistry, chemical fate and transport in aquatic systems, phase interactions and chemical equilibrium. Includes computer modeling, government regulations, pesticides and pollutants, hazardous waste and disposal methods. All topics will be studied from chemical, political and socioeconomic perspectives. 3 hrs. lec., 3 hrs. lab. Offered alternate spring semesters. Prereq: CHEM 375.

CHEM 482: 3 s.h.
Polymer Chemistry II
Topics in polymer physical chemistry, including conformation of polymer molecules, polymer solutions, theory of molecular weight determination methods, rheology, orientation, time-temperature dependence of physical properties, thermodynamics and kinetics of polymerization, rubber

Speech Communication Major (B.

sonal, group organizational and societal-cultural). Students develop understanding and appreciation of human diversity and competence in intercultural communication practices. Prereq: English 110 and junior class standing.

COMM 324: 3 s.h.
Advanced Topics in Organizational Communication
Content varies. Selected theoretical perspectives and topics in depth. Potential topics include: organizational cultural and critical studies; organizational conflict and conflict resolution processes; organizational semiotics; organizational group issues; decision making and leadership. Offered in spring. Prereq: COMM 100, 101, 201, 224; Junior status or permission of instructor.

COMM 342: 3 s.h.
Theories of Rhetoric
Principal figures, theories, and movements in rhetoric from the classical period to the present. The relationships between rhetoric and political, social and personal decisions are explored. Offered infrequently. Prereq: COMM 100.

COMM 380: 3 s.h.
Digital Media Writing
Writing and design course focusing on construction of promotional messages for digital media. Students will complete several projects including: critique of publication and web designs; planning and production of print and electronic publications; web site writing and layout. Offered fall, spring. Prereq: COMM 351 or COMM 326 and 60 sgi9anizatso

COMM 452: 3 s.h.
Public Relations Campaigns
Hands-on practice in public relations problem solving. Involves work in student-run "agencies" to develop and implement a public relations campaign for a nonprofit organization. Capstone course in public relations. Offered in fall, spring. Prereq: COMM 451.

Broadcasting

COMM 121: 3 s.h.
Introduction to Audio and Video
Audio and video production fundamentals, techniques and uses. Includes study of the production process and hands-on production assignments in both audio and video. Laboratory work required. Offered in fall, winter, spring.

COMM 220: 3 s.h.
Survey of the History, Structure and Social Impact of American Mass Media (G1)
A review of mass media in America and discussion of the social, cultural and technological forces that shape them. Evaluations of media criticism. Offered in fall, spring.

COMM 230: 3 s.h.
International Broadcasting (W)
Devoted to the cross-cultural study of the World Broadcasting Systems as an introduction to international electronic media. The course compares the ways in which the media are organized in other countries with that of the United States of America. Offered periodically. Prereq: ENGL 110, COMM majors, INTL majors, minors or permission of instructor.

COMM 320: 3 s.h.
Radio Production
Theory and production of various types of audio production using basic studio equipment. Laboratory work required. Offered in fall, spring. Prereq: COMM 121.

COMM 321: 3 s.h.
Television Production I
Theory and application of various phases of studio operation and editing in television production. Laboratory work required. Offered in fall, spring. Prereq: COMM 121.

COMM 322: 3 s.h.
Media Criticism
An examination of the processes and products of various media industries with a focus on understanding and learning to critique the ways in which the media, their texts and audiences exist within a set of increasingly complex relationships. Offered periodically. Prereq: COMM 201.

COMM 325: 3 s.h.
Broadcast News Reporting (W)
Style and other basics of radio and television news. Includes collecting data, writing stories, editing and producing video for campus cable TV station. Laboratory work required. Offered in fall. Prereq: ENGL 110, COMM 121 and basic typing skills.

COMM 326: 3 s.h.
Broadcast Workshop I (W)
Basic news writing and reporting, stressing electronic media. Offered in fall. Prereq: ENGL 110 or permission of instructor.

COMM 330: 3 s.h.
Media and Women's Culture (P)
The course focuses on the role of the media in the creation and reproduction of culture. It examines how gender, race and class are constructed in media texts, and how women in various social and cultural positions negotiate their own meanings in relation to media portrayals. Offered periodically. Prereq: Junior status, ENGL 110.

COMM 421: 3 s.h.
Television Production II
An advanced lecture-demonstration-laboratory application of the various phases of electronic field production, with special attention to directing and advanced editing techniques. Offered in spring. Prereq: COMM 321.

COMM 422: 3 s.h.
Advanced Audio Production

THEA 130: 3 s.h.
Acting I (G1, W)

B. CSCI Electives: 4 s.h.

Choose any 300 or 400 level computer science major course not in required CSCI courses above.

COURSE

attributes, line drawing algorithms, fill algorithms, curve fitting, clipping algorithms, three dimensional transformations, graphical I/O devices, 3-D modeling, animation, sensory tracking, virtual world modeling, virtual reality software tools, 3-D applications and graphics workstations. Offered periodically. Prereq: C- or higher in CSCI 362.

CSCI 380: 4 s.h.
Operating Systems
Design and implementation of operating systems including types of operating systems, file systems, resource management, concurrent processes, deadlocks, memory management techniques, processor scheduling, disk scheduling, operating system security and system administration. Students expected to develop significant operating systems programming projects. Offered in fall, spring. Prereq: C- or higher in CSCI 362, 370.

CSCI 395: 4 s.h.
Computer Networks (W)
Introduction to computer networks. Topics include network media, architecture and topology, protocols and layering, client-server models, Ethernet media and hardware, TCP/IP and other protocols, setup and system administration, application protocols and communication, network servers and services, security, data integrity, encryption, and firewalls. Offered periodically. C- or higher in Prereq: CSCI 362, ENGL 110.

CSCI 406: 1-4 s.h.
Topics in Computer Science
This course allows students and faculty to explore various topics in computer science that are not included in other course offerings. CSCI 406 may be taken more than once for cedit with departmental approval. Offered periodically. Prereq: Depends on topic to be studied.

CSCI 420: 4 s.h.
Software Engineering
Overview of software engineering concentrating on phases of the software development life cycle including waterfall model, iterative enhancement, prototyping, axiomatic and algebraic specifications, user interface design, and object-oriented design, testing, quality assurance and reliability. Team project provides students with practical experience applying techniques. Offered periodically. Prereq: C- or higher in CSCI 330 and CSCI 362.

CSCI 425: 4 s.h.
Human-Computer Interaction
Design, evaluation and implementation of interactive computing systems for human use including study of the major phenomena surrounding them. Presents a broad overview of the field with an emphasis on interface development and evaluation. Offered periodically. Prereq: C- or higher in CSCI 362 required; CSCI 380 recommended.

CSCI 426: 4 s.h.
Adaptive Technologies
An overview of the principles and techniques used in adaptive technology for the disabled. Topics include the universal design principle; user-centered design; interfacing specialized hardware devices; interaction methods such as Morse code, voice recognition and generation, scanning techniques, word expansion and word prediction; modes of communication, such as single or multi-switch, audio and voice; alternative languages; web accessibilty; and usability testing as a means of user/device evaluation and product acceptance. Prereq: C- or higher in CSCI 362.

CSCI 435: 4 s.h.
Compiler Construction
Students implement a compiler for a simplified modern programming language. Theory of compiler construction including finite state automata, LL(1) grammars and top-down parsing. Project includes lexical and syntax analysis, name storage, scope and type analysis, error recovery and code generation. Advanced topics covered as time permits including LR(k) grammars, bottom-up parsing, compiler generators (e.g., LEX and YACC) and code optimization. Offered periodically. Prereq: C- or higher in CSCI 330, 340, 362.

CSCI 450: 4 s.h.
Artificial Intelligence (W)
Introduction to artificial intelligence including problem solving, search, heuristic methods, machine learning, knowledge representation, natural language processing, computer vision, expert systems, theorem proving and current applications. Concepts illustrated through programs developed in LISP or Prolog. Offered periodically. Prereq: C- or higher in CSCI 340, 362; ENGL 110.

CSCI 456: 4 s.h.
Robotics and Computer Vision
Intelligent robotic systems that deal with physical world through visual, acoustic or tactile sensing. Fundamentals of robot vision including image acquisition and camera geometry, pattern recognition, representation and analysis of shape, pixel neighborhoods, connectivity, distance measures, arithmetic operations on pixels and images, computations of area, centroid, moments, axis of least inertia, correlation techniques, histogram computation, manipulation of robot end effectors, robot task coordination and simple Cartesian robot manipulation. Offered infrequently. C- or higher in CSCI 362.

CSCI 466: 4 s.h.
Database Management Systems
Introduction to software design using a relational and pro-relational database management systems. Data modeling, data normalization, database and application design, foundations of relational implementation, SQL, embedded SQL, and web-publishing of database contents. Offered periodically. Prereq: C- or higher in CSCI 362.

CSCI 467: 4 s.h.
Design and Analysis of Algorithms
Theory and techniques of algorithm design and analysis. For design, students will study variety of algorithmic solutions to problems from application areas including searching, selecting, sorting, graph theory, number theory and encryption. Design paradigms including greedy method, divide and conquer, dynamic programming, backtracking and branch-and-bound. For analysis, students will use formal techniques to classify execution time of an algorithm. Software tools are used to measure resources used by a program during execution. Offered infrequently. Prereq: C- or higher in CSCI 340.

CSCI 475: 4 s.h.
3D Game Programming and Computer Animation
Provide students with skills and solid technical foundation necessary to design, develop and deploy: 3D games and related entertainment technology applications. Topics include: 3D game programming, 3D graphics, programming video game controllers, collision detection, force and motion calculations, networking multiplayer games, manipulating sound objects, physical modeling, projectiles, particle systems, physical constraints, deformation of virtual 3D objects, surface deformation, computer animation, forward and inverse kinematics; keyframe motion capture and procedural animation; behavior-based animation and control; facial animation; smart characters and intelligent agents. Prereq: C- or higher in CSCI 362. Offered periodically.

CSCI 476: 4 s.h.
Parallel Programming
Overview of parallel computing through study of parallel programming. Topics include message-passing, highly32(of)32(parallel)32(c2uCI)Tj32(of tic2uCuting)] cnificat ojectie a f e p0 0 iseq:uied . rereq: 2sion

C* 504: 3-6s.h.
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students for teaching careers in the secondary schools. The core of the curriculum provides a sound education in the traditional earth sciences areas of oceanography, meteorology, geology and astronomy. Completion of this curriculum leads to certification in earth and space science. In addition, graduates may teach general science.

nism, mountain building and other manifestations of the Earth's dynamic interior. 3 hrs. lec. Does not count toward any ESCI major. Offered in fall, spring and periodically in summer.

ESCI 103: 3 s.h.
The Science of Evolution (G2)
Evolutionary theory through an integrated perspective of both biology and geology. 3 hrs. lec. No credit for biology and earth science majors. Prereq: 15 credit hours recommended.

ESCI 104: 3 s.h.
The World Ocean (G2)
A broad overview of the biological, chemical, geological and physical characteristics of the ocean, the importance of the oceans to mankind and the environment. Does not count toward any ESCI major. 3 hrs. lec. Offered in fall, spring and periodically in summer.

ESCI 105: 1 s.h.
World Ocean Laboratory (G2, L taken concurrently with ESCI 104)
Methods and techniques used in the marine sciences, including introduction to navigation, plotting and evaluation of data pertaining to salinity, temperature, dissolved oxygen, primary productivity and current velocity. 2 hrs. lab. Optional field trip. Mandatory coreq: ESCI 104. ESCI 104/105 together constitute a single laboratory course in earth sciences for purposes of the general education curriculum. Does not count toward any earth sciences major. Offered in fall, spring and periodically in summer.

ESCI 107: 3 s.h.
The Atmosphere (G2)
Origin and evolution of the atmosphere; solar and terrestrial radiation; horizontal and vertical structure of the atmosphere; temperature, pressure and water in the air; vertical motion; cloud formation and cloud type; circulation systems, severe weather, climate and climate change. 3 hrs. lec. Does not count toward any earth sciences major. Offered in fall, spring and online in summer and winter.

ESCI 109: 4 s.h.
The Atmosphere with Laboratory (G2, L)
Origin and evolution of the atmosphere; solar and terrestrial radiation; horizontal and vertical structure of the atmosphere; temperature, pressure and water in the air; vertical motion; cloud formation and cloud type; circulation systems, severe weather, climate and climate change. 3 hrs. lec., 2 hrs. lab. Does not count toward any earth sciences major. Offered in fall, spring and online in summer and winter.

ESCI 110: 2 s.h.
Introduction to Earth Sciences Programs
General introduction to each of the earth sciences disciplines and to college life. 2 hrs. lec. Offered in fall. Restricted to earth sciences majors with less than 30 credits.

ESCI 202/202H: 4 s.h.
The Earth in Space (G2, L)
A quantitative scientific experience directed toward an understanding of the dynamic earth, its origin and evolution and its place in the universe. Physical concepts from classical and modern physics, astronomy, cosmology, and the earth and atmospheric sciences, couched in the language of calculus, supported by observation, experiment and theory. 3 hrs. lec., 2 hrs. lab. Offered periodically in spring. Prereq: MATH 161 or MATH 163 or MATH 155. Restricted to students in the University Honors College, B.S. Ed. in earth sciences, or who have at least a 3.35 GPA.

Geology

ESCI 221: 4 s.h.
Physical Geology (G2, L)
The nature and distribution of materials of the solid Earth–the dynamic processes by which they are formed and modified and the character of resulting geologic structures. 3 hrs. lec., 2 hrs. lab. Offered in fall, spring and periodically in summer.

ESCI 222: 4 s.h.
Historical Geology (G2, L)
Methods of interpreting the geologic rock record, chronologic study of earth history and study of fossils as records of ancient life. Emphasis on the history of North America. 3 hrs. lec., 2 hrs. lab, field trips required. Prereq: ESCI 221. Offered in spring.

ESCI 225: 3 s.h.
Geomorphology
Processes of landscape development in theory and in the context of the regional geomorphology of North America. 3 hrs. lec. Offered in fall of odd years. Prereq: ESCI 221.

ESCI 227: 4 s.h.
Mineralogy
Identification, crystal chemistry, crystallography and occurrence of common minerals; optical theory and interaction of light with crystals; mineral identification through use of transmitted polarized light. 3 hrs. lec., 2 hrs. lab. Offered in fall of odd years. Prereq: ESCI 221, Prereq or Coreq: CHEM 112.

ESCI 320: 3 s.h.
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conservation of energy, mass and momentum); radiative transfer, cloud processes and atmospheric electrification. 3 hrs. lec. Offered in spring. Prereq: ESCI 241 or PHYS 231. Coreq or Prereq: MATH 311.

ESCI 341: 3 s.h.
Atmospheric Thermodynamics
First and second principles of thermodynamics, water-air systems, equilibrium of small droplets and crystals, thermodynamic processes in the atmo-

ESCI 445: 3 s.h.
Numerical Modeling of the Atmosphere and Oceans
Methods and mathematical concepts of numerical weather and ocean prediction models. Students must be able to program in one of the following languages: Fortran, C++, or IDL. 3 hrs. lec. Offered in spring of odd-numbered years. Prereq: ESCI 282 or CSCI 161. Coreq or Prereq: ESCI 343 or ESCI 365.

ESCI 446: 3 s.h.
Statistical Meteorology
Frequency distributions, sampling theory, linear and multiple regression analysis, time series, space variations of meteorological variables, statistical weather forecasting, forecast verification. 3 hrs. lec. Offered in fall. Prereq: MATH 235, MATH 311.

ESCI 447: 3 s.h.
Meteorological Instrumentation, Measurement, and Observing Systems (W)

ESCI 465 or BIOL 495: 3 s.h.
Biological Oceanography
Physical, chemical and biological factors controlling plant and animal populations in the marine environment; methods of sampling, identification and analysis. 2 hrs. lec., 3 hrs. lab. Offered during summer at Marine Science Consortium field station. Prereq: ESCI 261 and BIOL 211 and BIOL 221.

ESCI 466: 3 s.h.
Coastal Environmental Oceanography (P)
The interaction of chemical, physical, geological and ecological ocean processes as applied to coastal environments, emphasis on environmental management issues. Offered only in summers at Marine Science Consortium field station. 2 hrs. lec., 3 hrs. lab. Prereq: ESCI 261; ENGL 110 and junior status.

ESCI 467: 3 s.h.
Engineering Applications in the Coastal Zone
The application of coastal processes and engineering practices in order to solve coastal zone management issues; practical problems in wave forecasting/hindcasting and coastal zone responses to storms and human modification. Alternative methods used to mitigate coastal erosion processes. Introduction to coastal structures. 3 hrs. lec. Prereq: ESCI 326, 342 or 362.

Courses for All Earth Sciences Majors

ESCI 281: 3 s.h.
GIS Applications for the Earth Sciences
Introduction to the basic concepts of geospatial information systems applications for earth sciences students. Emphasis is on the use of GIS applications for solving problems in the earth sciences. Limited to earth sciences majors or minors who have completed one of the introductory earth sciences courses for majors. ESCI 281 and GEOG 295 may not both be taken for credit. 3 hrs. lec. Offered in fall of even years. Prereq: ESCI 221 or 241 or 261.

ESCI 282: 3 s.h.
FORTRAN Programming for Earth Sciences Applications
Programming in computational methods emphasizing FORTRAN applied to the earth sciences; numerical solution of equations of motion; statistical properties of digital images; analysis of periodical phenomena; use of National Center for Atmospheric Research graphics library. 2 hrs. lec., 2 hrs. lab. Offered in fall. Prereq: MATH 211 and PHYS 231.

ESCI 380: 3 s.h.
Remote Sensing and Image Interpretation
Principles of remote sensing; fundamentals of image enhancement; radiative transfer equation; use of Landsat and NOAA environmental satellite data in earth sciences; use of Environment for Visualizing Images (ENVI) software for image analysis and interpretation. Basic computer literacy is assumed. 2 hrs. lec., 2 hrs. lab. Research project is required.

ESCI 385: 3 s.h.
Global Change (W)
Evolution of the Earth's habitable atmosphere and oceans; mechanisms that control climate processes and change; past global climate change as deciphered through paleoclimatic and paleoceanographic methods; recent rapid climate fluctuations and possible future changes. 3 hrs. lec. Offered fall of odd years. Prereq: ENGL 110; ESCI 241 or 261 or GEOG 230.

ESCI 386: 3 s.h.
IDL Programming for Advanced Earth Sciences Applications
Overview of existing global data sets in geology, meteorology, and oceanography; HDF and Net CDF scientific data formats; use of Interactive Data Language (IDL) to analyze and display data. 2 hrs. lec., 2 hrs. lab. Offered in spring. Prereq: ESCI 282, MATH 211 and PHYS 231.

ESCI 485: 3 s.h.
Air/Sea Interaction
Physics of wind waves; turbulent fluxes at the air-sea interface; planetary boundary layers; low-frequency oceanic waves; storm surges; importance of the ocean for tropical climates; El-Niño-Southern Oscillation, monsoon circulations, tropical and extratropical cyclones. 3 hrs. lec. Offered in spring of even years. Prereq: ESCI 342 or 364.

Problems and Seminar

ESCI 390: 1-4 s.h.
Topics in the Earth Sciences
Detailed investigation of a topic of current research interest. Topic to be announced each time course is offered. Credit and meeting hours variable, depending on topic offered. Offered infrequently. Prereq: completion of 60 credits.

ESCI 497: 1 s.h.
Seminar in the Earth Sciences
The interrelationships of the earth sciences disciplines as environmental sciences, viewed in the context of contemporary science. Offered infrequently. Prereq: completion of 60 credits.

ESCI 498: 1-3 s.h.
Independent Study in the Earth Sciences
Supervised independent research in the earth sciences. Subject determined jointly by student and the problem supervisor. Permission of department chair and school dean required.

Honors Course

See *Honors* section of this catalog.

ECONOMICS

School of Humanities and Social Sciences

Professor Smith, chairperson
Professors Gumpper, Suliman
Associate Professors Madden
Assistant Professor Baker

The Department of Economics offers a B.A. degree in economics with options in quantitative economics, financial economics and political economy.

Economics is the study of how a society is organized to produce and distribute material goods and services. It is a combination of technical knowledge of industry and commerce as well as a broad theoretical and practical understanding of major aspects of the economy.

The economics major requirement includes a basic core of courses in economic principles and theory. The student, in consultation with an adviser, may then select courses based on individual interest and the wide variety of career options available to economics majors.

As one of the crucial fields in the government, manufacturing and service sectors, students will find economics to be an especially attractive field to help them prepare for a future career. By virtue of its broad nature, economics readily widens students' choices to join the work force and/or pursue their graduate studies. Students who wish to join the work force, attend law school or work toward advanced degrees in other applied areas are advised to choose the basic B.A. in economics, which emphasizes preparation in applied economics and data processing. Those who plan to do graduate studies in economics or business are advised to take the B.A. in economics–quantitative option, which offers more preparation in mathematics, statistics and theoretical economics. Students interested in government, politics and law may take the political economy option. Students interested in financial services and investments may take the financial economics option.

Potential areas of employment for economics students are diverse. They include the financial sector, government sector and manufacturing sector. The flexibility of the programs not only provides internship and cooperative education opportunities with local industry, but, with the proper advisement, also permits students to combine course work with computer science, mathematics, social sciences, business, humanities, natural sciences and communication arts.

The economics minor program is intended to provide a background in economics to the student with a major in another field. The technical economics minor is intended to serve the needs of students from mathematics and the sciences who are interested in combining their degrees with economics and related areas and/or planning to pursue their graduate studies in economics and related areas. This minor is open to all interested students.

ECON 498: Variable Credit (1-3 s.h.)
Independent Study
For further information on independent study, see the *Special Academic Opportunities* section.

ECON 586, 686: 3 s.h.
Topics in Economics

EDUCATIONAL FOUNDATIONS

School of Education
Associate Professor Ward, Chairperson
Professors Desmond, McDowell, Smith, Stengel
Associate Professors Deemer, Hanich
Assistant Professors Curry, Dietrich, Dreon, Seda, Scott
Instructor Lauris

tions and opportunities shape women, but also how the presence of women in educational activities alters the nature of that enterprise. Offered periodically. Prereq: ENGL 110, junior status.

EDFN 320/520: 3 s.h.
Instructional Technology in Elementary Education
Students use case studies to explore the uses of technology and its application in elementary education. Topics include computer basics, applications software, curriculum integration, evaluation of educational software, telecommunications and multimedia presentation systems. Students are provided a series of hands-on experiences with hardware and software to develop the skills and competencies required of the elementary education teacher. No credit given if credit earned in EDFN 130, 220, 230, 330/530, 333/533 or EDAR 330/530.

EDSE 321: 3 s.h.
Issues in Secondary Education
Examines the role of the secondary teacher, issues encountered in the classroom and classroom interactions. Includes field experiences. Students should arrange their schedules to allow for at least two half days per week for public school experiences during the course. Offered in fall, spring. Prereq: EDFN 211, EDFN 241. Admission to advanced professional studies. Must be taken simultaneously with EDFN 330 and one of the following: EDSE 433, EDSE 435, ENGL 485, FORL 480, MATH 405, EDTE 391.

EDFN 330/530: 3 s.h.
Instructional Technology, Design and Assessment
Instructional design and assessment will be used as a basis for planning and evaluating the use of technology for student-centered teaching and learning within specific disciplines. Offered in fall, spring. Must be taken as a block with EDSE 321 and the Teaching of Methods class required in each secondary certification program. For secondary education majors only. Admission to advanced professional studies. No credit given if credit earned in EDFN 130, 220, 230, 320/520, 333/533 or EDAR 330/530.

EDFN 333/533: 3 s.h.
Instructional Technology in Special Education
Provides special education pre-service teachers with experiences in the use of technology for teaching and learning. Topics include basic computer systems (Macintosh and Windows® platforms), evaluating instructional software for special needs students, computer applications software (word processing, spreadsheets, draw, paint and data bases), telecommunications (Internet and email), multimedia presentations, integrating technology into the curriculum and field experiences. Offered in fall, spring. No credit given if credit earned in EDFN 130, 220, 230, 320/520, 330/530 or EDAR 330/530.

EDFN 376: 3 s.h.
Whose School Is it, Anyway? The Struggle for Equity in American Schooling
Historical, political and legal investigation of American public schooling in the 19th and 20th centuries and of the issue of equal educational opportunity in regard to gender, class, race and ethnicity. Students should have completed a lower level history, historiography, political science or educational history course. Offered annually.

EDFN 386, 387, 388: 1-6 s.h.
Topics in Educational Foundations
Detailed investigation of a topic of current interest. Topic to be announced each time course is offered. Credit and meeting hours variable, depending on topic offered. May be taken more than once for credit as topic varies. Offered periodically.

EDFN 398: 3 s.h.
Urban Immersion Seminar (P)
Intensive living-learning experience based in an urban setting. On-site experience in urban schools and social service agencies is provided as

Students complete Foundations of Modern Education (EDFN 211), Psychological Foundations of Teaching (EDFN 241) and Foundations of Reading (EDUC 220) and examine the role of the teacher, the learner, the school environment and the classroom as a social setting. A practicum experience of considerable length allows students to make application of their new knowledge.

Required Related Courses: Art 141, MATH 104, MATH 105, MUSI 103 or MUSI 104, WELL 352.

Professional Block: ELED 325, 340, 351, 361 and EDUC 305.

The professional semester is an integrated program of professional education courses normally completed in the student's junior or senior year. It is composed of 16 s.h. A practicum experience in the local schools is required in conjunction with the four courses of the elementary education professional block.

Before enrolling in professional block the student must satisfy the following prerequisites:

1. Gain admission to APS with a minimum of 60 credit hours and an overall Grade Point Average (GPA) of 3.0 or higher.
2. Earn a qualifying score on the following Pennsylvania Certification (PRAXIS I) tests:

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3. Earn a C (2.0) or higher in ENGL 110 and pass an additional 3 credit English literature course.
4. Earn a grade of C (2.0) or higher in all courses completed in the major, including required related courses.
5. Pass a laboratory course in science.
6.

to evaluate his/her commitment to a career in early childhood education. For early childhood certification students only. No credit given if credit earned in EDUC 215. Offered in fall, spring.

EDUC 215: 3 s.h.
The Young Child and Education
Elective for an education major, but not for an early childhood education certification student. No credit given if credit earned in ELED 210. Overview of the young child in educational settings. Emphasis on developmentally appropriate teaching techniques, learning materials and environments. Focus on developmental needs, individual characteristics and socio-cultural considerations. Weekly observation/participation in an early childhood setting applies theory to practice. Offered annually.

EDUC 220: 3 s.h.
Foundations of Reading
Introduces topics in the field of teaching reading, including: emergent literacy, approaches to reading instruction, word recognition and vocabulary development, comprehension instruction, assessment techniques and reading instruction for the multicultural and the exceptional child. Supplemented by a field experience. Offered in fall, spring. Prereq: ELED 100 or SPED 101.

EDUC 305: 1-3 s.h.
Field Experiences
Specific work and study assignments constituting the field experience will be developed. Regular discussions, conferences and group seminars will be conducted by faculty members and field supervisors to clarify generalizations that link practice to theory. The assignments will be in public schools. Offered in fall, spring.

ELED 312: 3 s.h.
Seminar: Prekindergarten
A practical application of prekindergarten teaching philosophies and methods. Includes field experiences in nursery schools, Head Start, public ey1I--Text₹EFF0ction,5004[(ey1ctionS7(gr)d.)-11(nS7wonstitnstitnstitnsticept1v arly)-34(t1v arlce. rld)- arexperiences arJT*[(will sticences)-27(and arl7(gr)18(

ELED 312: 3 s.h.

ELED 340: 3 s.h.
Teaching of Social Studies
An overview and examination of social studies curriculum for the elementary classroom. Emphasis on philosophy, methods and materials for the teaching of social studies. Special emphasis on integration of the social sciences, especially economics, history and geography. Offered in fall, spring. Prereq: 60 s.h. and admission to Advanced Professional Studies (APS).

ELED 351: 3 s.h.
Teaching of Mathematics
For elementary education majors with emphasis on modern curricula and methods of teaching mathematics in elementary schools. Examinations of texts, supplementary teaching materials and teaching devices. Study of research findings. Offered in fall, spring. Prereq: MATH 105, 60 s.h. and admission to Advanced Professional Studies (APS).

ELED 361: 3 s.h.
Teaching of Science
An overview of the content and processes included in an elementary school science program, plus a study of methodology and instructional skills appropriate to the elementary school setting. Offered in fall, spring. Prereq: laboratory course in the sciences, 60 s.h. and admission to Advanced Professional Studies (APS).

ELED 371: 3 s.h.
Teaching Gifted and Able Children (W)
Designed to acquaint prospective teachers with some viable techniques for dealing with gifted and able children in their classrooms. Some attention will also be paid to reviewing existing programs and means of identification. Some work with gifted students in the schools will be another component of the course. Offered infrequently. Prereq: ENGL 110.

ELED 376: 3 s.h.
Assessment for Instructional Planning (W)
Principles, procedures and use of traditional and alternative testing and measurement to make curricular decisions to enhance student learning in the elementary classroom. Emphasizes analysis of student learning to inform teacher decision making. Prereq: ENGL 110, EDUC 220, EDFN 211, EDFN 241, MATH 104. Coreq: MATH 105. Offered in fall, spring.

EDUC 376: 3 s.h.
Strategies for Classroom Management
Covers contemporary classroom management in today's elementary schools. Emphasis on prevention of management breakdown and developing a positive success-based environment. Offered in fall, spring.

EDUC 403: 3 s.h.
Cultural Diversity: Pluralism in the Classroom (W)
Provides historical and present day information about different racial, cultural and linguistic groups represented in our society. Explores the challenge of providing an equitable and effective education to all and provides methods and materials that can be used in the classroom. Offered in fall, spring. Prereq: ENGL 110.

ELED 405: 3 s.h.
Creative Activities in the Elementary School
General theory of creativity. Consideration of the basic principles of creative teaching as they relate to the various curricular areas in the elementary school. Activities and experiences applied to creative teaching. Offered in spring, summer.

ELED 419: 3 s.h.
Seminar in Early Childhood Education
Investigation of contemporary goals of early childhood education. Provides analysis of organizational plans, classroom environment, teaching strategies and resources and noteworthy trends and innovations. Application to individual situations is stressed. Focus will vary. Offered infrequently.

EDUC 424: 3 s.h.
Diagnostic Reading (W)
The first of two elective courses in diagnostic reading for undergraduate students will be an introduction to various formal and informal means to assess the reading strengths and needs of children. Offered in fall, spring. Prereq: EDUC 220; ENGL 110.

EDUC 425: 3 s.h.equentlttua>BDC 0 -1xGiEequentlttua>BDC 0 -1xGiEequentlttua>BDC 0 -1xGiEequentlttua>BDC 0 -1xGiE

EDUC 451: 3 s.h.
Measurement, Problem Solving and the Metric System
Implementation of the metric system in schools, techniques for problem solving and applications of mathematics to the world of measurement. Offered infrequently.

EDUC 475: 3 s.h.
Current Trends in Education
A survey of current and future curricular and instructional trends in education. Emphasis on identification, examination and evaluation of topics, methods, strategies and issues affecting teaching and learning. Offered infrequently.

EDUC 486: 3 s.h.
Topics in Education
In-depth investigation and development of one or more topics of current interest not normally covered in regular courses. Special topics/methods will vary according to the needs of students and faculty. Offered infrequently.

ELED 498: 1-3 s.h.
Independent Study
Conferences and seminars designed for special study of particular topics in elementary education. Emphasis on new and emerging curriculum for teaching. Prereq: 60 s.h. and approval of the department chairperson. Offered periodically.

ELED 489, 499: 1-4 s.h.
Departmental Honors
For the definition of departmental honors and eligibility refer to the *Special Academic Opportunities* section of this catalog.

EDEL 461: 6 s.h.

EDEL 462: 6 s.h.
Student Teaching and Seminar
Students must satisfactorily complete student teaching in order to qualify for certification. Seminar sessions are required. Students in the dual certification elementary and special education program must have one experience in an elementary classroom and one experience in a special education classroom. Offered in fall, spring.

REQUIRED RELATED COURSES

ART 141: 3 s.h.
Fundamentals of Studio Art

WELL 352: 3 s.h.
Health Education in Elementary Schools

MATH 104: 3 s.h.
Fundamentals of Math I

MATH 105: 3 s.h.
Fundamentals of Math II

MUSI 103: 3 s.h.
Language of Music I
or
MUSI 104: 3 s.h.
Language of Music II

GRADUATE LEVEL COURSES

All 500 level courses are open to qualified undergraduates with permission from the instructor. For course descriptions, please refer to the *Graduate Catalog.*

ELED 502: 3 s.h.
Education in Today's Elementary School
Offered in summer.

ELED 505: 3 s.h.
Creative Activities in the Elementary School
Offered in spring, summer.

ELED 519: 3 s.h.
Seminar in Early Childhood Education
Offered periodically.

ELED 533: 3 s.h.
Nonfiction Literature and Literacy
Offered periodically.

EDUC 534: 3 s.h.
Creative Dramatics
Offered periodically.

EDUC 535: 3 s.h.
Literature for Children and Young Adolescents
Offered in fall, spring.

EDUC 536: 3 s.h.
Picture Book Communication
Offered infrequently.

EDUC 551: 3 s.h.
Measurement, Problem Solving and the Metric System
Offered infrequently.

EDUC 561: 3 s.h.
Second Language Acquisition: Theory, Programs and Assessment
Offered fall, spring.

EDUC 562: 3 s.h.
Methods for Teaching English Language Learners
Offered fall, spring.

EDUC 563: 3 s.h.
Linguistic and Cultural Diversity in the Classroom
Offered fall, spring.

EDUC 564: 3 s.h.
Current Trends and Policies in the Teaching of English Language Learners: Seminar and Community Service
Offered annually.

EDUC 575: 3 s.h.
Current Trends in Education
Offered periodically.

ELED 576: 3 s.h.
Assesment for Instructional Planning
Offered fall, spring.

EDUC 586-589: 3 s.h.
Topics in Education
Offered periodically.

ENGINEERING

See Chemistry and Physics

ENGLISH

School of Humanities and

In planning a course of study, English majors must consult with their departmental academic advisers on a regular basis, because

English Major (B.A. or B.S. Ed.)
Film Studies Option

General English Minor
18 credits minimum (beyond the required composition courses) including at least one course in each of the following areas: language/linguistics, literature and writing. Selection of individual courses must be consistent with University-wide curricular policies for minors.

American Literature Minor
18 credits minimum (beyond required composition courses) including ENGL 235, 236, 237 and three of the following: ENGL 331*, 421, 422, 423, 424, 425, 426, 427, 428, 429, 482, HUMN 400*.

*When its primary focus is American Literature.

British Literature Minor
18 credits minimum (beyond required composition courses) including ENGL 233, 234, 237, 405 and two of the following: ENGL 331*, 403, 404, 406, 407, 408, 411, 412, 413, 414, 415, HUMN 400*.

*When its primary focus is British Literature.

Film Studies Minor
18 credits minimum (beyond required composition courses) including ENGL 240, 347, 481, 482, 484 and one of the following: PHIL 327, ANTH 227, ECON 305. Students may apply to count film courses taken at Franklin & Marshall College.

Linguistics Minor
18 credits minimum (beyond required composition courses) including ENGL 220, 321, 322, 462, 463 and one of the following: ENGL 221, 464, 465.

Writing Minor
18 credits minimum, (beyond required composition courses) including ENGL 237, 311, 313, either 312 or 316, and additional ENGL credits from

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literatdg4EJT*(465.)Tj9310 1 ENg 2g>BdG, 403, 404,
406, 407, 408, 411, (010: 3yAcg 481,)-47L

ENGL 234: 3 s.h.
Later English Literature (G1)
Survey of English literature from 1800 to the present. ENGL 233 is not a prerequisite. Emphasis on historical and cultural contexts; new genres and thematic relationships. Offered annually.

ENGL 235: 3 s.h.
Early American Literature (G1)
Survey of American literature from colonial times to 1865. Offered in fall, spring.

ENGL 236: 3 s.h.
Later American Literature (G1)
Survey of American literature from 1865 to present. ENGL 235 is not a prerequisite. Offered in fall, spring.

ENGL 237: 3 s.h.
Introduction to Techniques of Literary Research and Analysis
Textual, critical and rhetorical analyses of literary genres. Designed to familiarize the student with literary theory and interpretation of genres through research and analytical writing. Offered in fall, spring.

ENGL 238H: 3 s.h.
The Western Literary Tradition I (G1, W)
Major works of the Western literary tradition from the Ancient World through the Renaissance. Offered annually. Prereq: ENGL 110, Member University Honors College or 3.35 GPA.

ENGL 239H: 3 s.h.
The Western Literary Tradition II (G1, W)
Major works of the Western literary tradition from the Neoclassical period through Modernism. Offered annually. Prereq: ENGL 110, Member University Honors College or 3.35 GPA.

ENGL 240/240H: 3 s.h.
Introduction to Film (G1, W)
Interpretation of film as an art form, including technical and artistic aspects of film making. Genres, auteur theory and other theoretical approaches

ENGL 445: 3 s.h.
The Short Story
Covers history, development, and genres of the short story with a focus on matters of style, interdisciplinary dimensions, historico-cultural context and critical approaches.Offered annually. Prereq: ENGL 110

ENGL 451: 3 s.h.
Literary Criticism and Theory
Seminar on major critics and theorists from Plato and Aristotle to selected modern critics. Explores representative critical trends and controversies. Prereq: ENGL 110.

Linguistics

All classes listed in the Linguistics section are offered periodically.

ENGL 462: 3 s.h.
Dialects of American English (P)
Study of the origin and the features of the regional and social dialects of American English. Prereq: ENGL 110 and junior status and one course in linguistics or permission of instructor.

ENGL 463: 3 s.h.
Applied Linguistics (G1, W)
Application of linguistic theory to selected problems of language teaching and research. Prereq: ENGL 110 and one course in linguistics or permission of instructor.

ENGL 464: 3 s.h.
Teaching English to Speakers of Llangs W)

Education

ENGL 485: 3 s.h.
Teaching Secondary School English
Specialized problems of English instruction. Required for B.S.Ed. in English. Offered in fall, spring. Prereq: Successful completion of the social and psychological foundations block and admission to Advanced Professional Studies. Must be taken during semester immediately prior to EDSE 461, Student Teaching and Seminar. Must be taken concurrently with EDSE 321.

ENGL 486: 3 s.h.
Teaching Reading and Literature with Young Adults
Inquiries into reading and literature in middle and high school classrooms. Special emphases on strategies for motivation, engagement and support in reading; creating appropriate learning contexts; expanding student choice and book selection; and alternative methods of assessing reading/literature achievement. Required for BSE in English. Course should be taken prior to Advanced Professional Studies block (preferably as juniors or seniors). Offered in fall, spring.

ENGL 487: 3 s.h.
Seminar in Teaching Writing
Development, analysis and evaluation of instructional materials and approaches appropriate to the students being taught by each student teacher with special emphasis on understanding and implementing The Pennsylvania Comprehensive Reading/Communication Arts Plan. Must be taken prior to student teaching. Offered in fall, spring. Prereq: ENGL 110.

SPECIAL ACADEMIC OPPORTUNITIES

Honors Courses

ENGL 110H, ENGL 238H, ENGL 239H, ENGL 240H, ENGL 333H, ENGL 334H, ENGL 405H, ENGL 407H, ENGL 441H. See course descriptions as listed within this department. Also see *Honors* section of this catalog.

Cooperative Education/Internships

ENGL 300 and ENGL 400: 3-6 s.h.
See course descriptions as listed within this department.

Independent Study and/or Departmental Honors

ENGL 498: 1-3 s.h.
For information on independent study and departmental honors, see the *Special Academic Opportunities* section and your adviser.

GRADUATE COURSES

All 500-level courses are open to qualified undergraduates with permission. For course descriptions, please refer to the *Graduate Catalog.*

ENGL 586-589: 3 s.h.
Special Topics

In addition to course requirements outlined by each department, students must meet additional degree requirements. For more information, see the Academic Requirements section.

ENVIRONMENTAL HAZARDS & EMERGENCY MANAGEMENT

Environmental Hazards & Emergency Management is an 18-credit interdisciplinary minor that draws upon the expertise and resources of four academic disciplines: sociology, geography, occupational safety & environmental health and Earth sciences.

The curriculum has been designed to meet the professional development needs of those undergraduates who may wish to seek employment in emergency management within government or private enterprise. The EHEM minor has been designed to also meet the needs of undergraduates who may not seek a career in emergency management, but who may wish to learn about the field in conjunction with their primary career interests, e.g., the future journalist who may be reporting on environmental hazards, emergencies and disasters, or the future planner who may need to assess mitigation plans.

Students selecting the minor must take the four required courses, as well as two courses from a list of four electives. A list of additional "suggested" courses is included which provide knowledge and skills that are beneficial to the emergency management professional. These courses may be used to fulfill requirements in the general education curriculum or in the major, or might serve as electives which bring a student's total curriculum up to 120 credits. One course used to complete the EHEM minor may also be used to satisfy the student's major, when applicable. In addition to satisfying course requirements, an EHEM student will, in consultation

REQUIRED AND RECOMMENDED EHEM COURSES (Course descriptions may be found under the appropriate departmental listing of courses.)

Required Courses

ESCI 101: 3 s.h.
Earth Systems and Natural Hazards

OSEH 120: 3 s.h.
Introduction to Occupational Safety

SOCY 313: 3 s.h.
Sociology of Disaster

GEOG 372: 3 s.h.
Urban and Regional Planning

Elective Courses

CHEM 101: 3 s.h.
Chemistry! Better Things for Better Living

OSEH 221: 3 s.h.
Industrial Fire Prevention, Protection and Control

GEOG 295: 3 s.h.
Geographic Information Systems

EHEM 498: 3 - 6 s.h.
Internship or Special Independent Project in Emergency Management (contracted with any of the participating departments)

Suggested Courses

BUAD 251: 3 s.h.
Organization and Management

ESCI 221: 4 s.h.
Physical Geology

ESCI 245: 3 s.h.
Environmental Meteorology

ESCI 261: 4 s.h.
Introduction to Oceanography

GEOG 281: 3 s.h.
Map Interpretation and Analysis

GOVT 112: 3 s.h.
State and Local Government

GOVT 241: 3 s.h.
Public Administration

PSYC 329: 3 s.h.
Industrial/Organizational Psychology

SOCY 101: 3 s.h.
Introduction to Sociology

SOCY 211: 3 s.h.
Social Problems

ENVIRONMENTAL STUDIES

Five multi-disciplinary minors are available that have been designed for students with an environmental interest. We believe that a full major in a discipline is an important foundation on which to build expertise in a specific environmental area and designed the minors to complement majors in the sciences, technology, and social sciences. Increasingly environmental problems are addressed by multidisciplinary teams, so the minors prepare students to operate in this multidisciplinary setting.

The environmental minors are coordinated by the Center for Environmental Science (CES), and the director of the CES is the primary contact for the minors.

For information on environmental studies and for course prerequisites, also see the *Biology, Chemistry, Earth Sciences and Geography* sections.

For information on environmental options within majors, also see the *Biology, Chemistry, Earth Sciences and Geography* sections.

Environmental Policy and Regulation Minor: 21 s.h.
This minor prepares a student to move successfully toward graduate school in policy or as staffers in the environmental regulation/policy community.

Core Courses

ECON 207: 3 s.h.
Environmental Economics
ENVI 330: 3 s.h.
Environmental Statistics and Risk Assessment

OSEH 220: 3 s.h.
Legal Aspects of Environmental Safety

OSEH 435: 3 s.h.
Environmental Technology

ENVI 495: 3 s.h.
Environmental Clinic

Elective Courses (Choose Two)

ECON 316: 3 s.h.
Public Finance

GEOG 372: 3 s.h.
Urban and Regional Planning (W)

SOCY 313: 3 s.h.
Sociology of Disaster

Industrial and Environmental Health Minor: 21-22 s.h.

Elective Courses

Choose One of the Following:

GEOG 230: 3 s.h.
Physical Geography

ESCI 225: 3 s.h.
Geomorphology

Choose One of the Following:

GEOG 227: 3 s.h.
Urban Geography (W)

GEOG 305: 3 s.h.
Geography of Energy (W)

GEOG 333: 3 s.h.
Biogeography

GEOG 434: 3 s.h.
Hydrology

ESCI 426: 3 s.h.
Groundwater Geology

OSEH 220: 3 s.h.
Legal Aspects of Environmental Safety

Quantitative Methods in Environmental Science Minor: 21-22 s.h.
This minor emphasizes the quantitative and technical skills that are valued by both employers and graduate programs in environmental science.

Core Course

ENVI 495: 3 s.h.
Environmental Clinic

Elective Courses

Choose One Statistics Course from:

ENVI 330: 3 s.h.
Environmental Statistics and Risk Assessment

BIOL 375: 3 s.h.
Biometry

Choose One of the Following:

ESCI 386: 3 s.h.
Earth System Data Visualization and Modeling

GEOG 295: 3 s.h.
Geographic Information Systems

Choose Four of the Following:

ESCI 267: 3 s.h.
Field Methods in Oceanography

ESCI 349: 4. s.h.
Chemistry of the Atmosphere (P)

ESCI 426: 3 s.h.
Groundwater Geology

ESCI 447: 3 s.h.
Meteorological Instruments, Measurement, and Observing Systems

CHEM 265: 4 s.h.
Quantitative Analysis

CHEM 375: 4 s.h.
Environmental Chemistry

CHEM 476: 4 s.h.
Environmental Chemistry II

BIOL 449: 3 s.h.
Plant Communities

OSEH 321: 4 s.h.
Environmental and Industrial Hygiene I

ITEC 465: 3 s.h.
Instrumentation and Control

Water Resources Minor: 22 s.h.
This minor provides an environmental perspective on water resource issues including remediation techniques and solutions, chemical analysis techniques, and the use of aquatic organisms to monitor contamination and recovery.

Required Courses

GEOG 304: 3 s.h.
Water Resources Management (P)

GEOG 434: 3 s.h.
Hydrology

CHEM 375: 4 s.h.
Environmental Chemistry

ESCI 329: 3 s.h.
Aqueous Geochemistry (W)

ESCI 426: 3 s.h.
Groundwater Geology

BIOL 445: 3 s.h.
Aquatic Biology

ENVI 495: 3 s.h.
Environmental Clinic

COURSE DESCRIPTIONS
Course descriptions are found in the appropriate departmental section.

ENVI 330: 3 s.h.
Environmental Statistics and Risk Assessment
Methods of statistical analysis and risk assessment applied to environmental science including: characteristics of environmental quality data; statistical measures and distributions; identifying system changes; hypothesis testing of environmental quality; risk, hazards and exposures; bioassays. Team-taught. Offered periodically. Prereq: MATH 130 or 235 or 333 or BIOL 375.

ENVI 495: 3 s.h.
Environmental Clinic
A capstone course devoted to the definition and assessment of an environmental problem from watershed, airshed, biodiversity, and human health perspectives. Case studies will be used as models of how environmental problems can be defined/documented and solutions can be implemented. Student teams will define a problem and implement a solution using interdisciplinary approaches while working with a faculty team. Students are encouraged to take this course at the conclusion of the minor. Offered periodically. Prereq: 12 credits of environmental science minor.

FINANCE

See Business Administration

FOREIGN LANGUAGES

School of Humanities and Social Sciences

Associate Professor Gaudry-Hudson, chairperson
Professor Hopkins
Associate Professors Börger-Greco, Milovanovíc, Nimmrichter, Rivera-Hernández
Assistant Professors Antolín, Moine

For initial placement of freshmen, the department advises that the following guidelines be used:

0-1 year of high school FORL	FORL 101
2 years of high school FORL	FORL 102
3-4 years of high school FORL	FORL 201
4-5 years of high school FORL	FORL 202

A placement examination will be administered every semester to incoming freshman language majors and to those non-majors intending to take FORL 201, 202, 351 or 352. Consult individual language sections for current policy.

Students who, in the first week of classes, consider themselves improperly placed should discuss the matter with their instructor so that changes can be made promptly.

Attention is called to the Millersville University Foreign Language Summer Institutes, in which graduate students live together in their own schools and speak the foreign language at all times. Well-prepared undergraduate students may participate following their junior year with a recommendation from their department chairperson and adviser.

All students are required to take an oral proficiency interview at the end of their sophomore year.

All modern language majors are required to take, prior to graduation, an oral proficiency interview; a comprehensive test on culture, history, literature and current events; and to compile a portfolio.

STUDY ABROAD

FREN 201: 3 s.h.
Intermediate French I (G1)
Emphasis is placed on further developing the receptive and productive skills through varied realistic exercises and in authentic real-life situations. Contemporary cultural and literary texts provide the thematic basis for oral and written communication. Offered in fall. Prereq: FREN 102 or 3 yrs. of h.s. French.

FREN 202: 3 s.h.
Intermediate French II (G1)
Continued receptive and productive skills started in FREN 201. Communication in speech and writing remains the primary goal; structures and vocabulary are studied in greater depth. Emphasis on developing a cross-cultural perspective by comparing the native with the target culture. Offered in spring. Prereq: FREN 201 or 4 yrs. of h.s. French.

HUMN 210: 3 s.h.
French Literature in English (G1, W)
Outstanding masterpieces taught in English by an instructor of French. Designed primarily as an elective for non-majors desirous of enriching their knowledge of foreign literature. Offered periodically. Prereq: ENGL 110.

HUMN 391: 3 s.h.
Topics in the Humanities (G1, W)
In-depth investigation and development of a topic of current interest not covered in regularly scheduled courses. The topics will vary according to the needs and interests of the students and the faculty involved. Specific topics will be identified by the subtitles each time the course is offered. Course may be taken for credit each time the content (subtitle) is different. Offered periodically. Prereq: ENGL 110.

FREN 301: 3 s.h.
Commercial French
Commercial vocabulary and stylistics of French for the professions. The parts of the business letter; study of general types of business correspondence, oral and written interactions in a professional context, including letters requesting and offering information, mail orders, sales letters, applications for employment, complaints, claims, collection, credit, etc. Includes the opportunity to take the Certificat de Français Professionnel given by the Paris Chamber of Commerce. (Certificate of Professional French Level 1 and 2, DFAs.) Offered periodically. Prereq: FREN 202 or 351.

FREN 311: 3 s.h.
Survey of Literature I
Life and work of foremost French writers through the 18th century. Reading and discussion of selected works in various genres. Offered in spring. Prereq: FREN 351 or 352.

FREN 312: 3 s.h.
Survey of Literature II
Life and work of foremost French and Francophone writers since 1800. Reading and discussion of selected works in various genres. Offered in spring. Prereq: FREN 311 or permission of instructor.

FREN 331: 3 s.h.
French Civilization I
History and development of French civilization from prehistoric times to 1fE[(sprinsE[(sprs-3)2(and)(pant)2(of)4(the2(Gaulers, 44(tiuesince)2(of)4(the2(RoHum[

FREN 411: 3 s.h.
French Poetry through the Ages
From Marie de France and Villon (medieval) to Char and Prévert (contemporary), French Letters can boast of an extraordinary range of poets. Their works, poetic techniques, forms and cross-fertilization with music (the “chanson”) are studied. Offered infrequently. Prereq: FREN 311 and 312.

FREN 421: 3 s.h.
French Drama I
Medieval period to the 18th century. Masterpieces of age of classicism in French; emphasis on Molière, Corneille and Racine. Outside readings. Offered infrequently. Prereq: FREN 311 and 312.

FREN 422: 3 s.h.
French Drama II
The life and works of representative dramatics of the 18th and 19th centuries, including Marivaux, Voltaire, Beaumarchais, Hugo, Musset. Offered infrequently. Prereq: FREN 311 and 312.

FREN 423: 3 s.h.
French Drama III
Symbolist drama, existentialist drama and the theater of the absurd. The plays of Claudel, Giraudoux, Anouilh, Montherlant, Sartre, Camus, Beckett, Ionesco, Adamov and others will be included. Offered infrequently. Prereq: FREN 311 and 312.

FREN 431: 3 s.h.
French Prose I
Study of essays, letters, maxims, memoirs and novels to the end of the 17th century. Works of Rabelais, Montaigne, Pascal, La Bruyère will be included. Outside readings, class reports. Offered infrequently. Prereq: FREN 311 and 312.

FREN 432: 3 s.h.
French Prose II
Short stories, essays and novels by 18th and 19th-century authors. Works of Voltaire, Rousseau, Diderot, Stendhal, Balzac, Hugo, Flaubert, Maupassant, Zola, etc., will be included. Outside readings, class reports. Offered infrequently. Prereq: FREN 311 and 312.

FREN 433: 3 s.h.
French Prose III
Essays, short stories and novels from the beginning of the 20th-century to the present. Works by Camus, Gide, Malraux, Proust, Sartre, Saint-Exupéry and the “nouveau roman.” Outside readings and class reports. Offered infrequently and/or online. Prereq: FREN 311 and 312.

FREN 460: 3 s.h.
Introduction to Translation and Interpretation
Expert guidance for avoiding the pitfalls inherent in transposing thought from one language to another, for students with a firm oral and written

FREN 409 (509): 3 s.h.
Applied Linguistics

FREN 416 (512): 3 s.h.
Introduction to Phonetics

FREN 417 (513): 3 s.h.
Advanced Phonetics

FREN 441 (521): 3 s.h.
Functional Grammar Review

FREN 442 (522): 3 s.h.
Composition

FREN 443 (523): 3 s.h.

GERM 421: 3 s.h.
German Drama I
Dramas covering the 18th and first half of the 19th centuries. Lectures on dramatists and changes within the structure of dramas. Student research papers. Offered infrequently. Prereq: GERM 311 and 312.

GERM 422: 3 s.h.
German Drama II
Dramas covering the second half of the 19th century and into the 20th century. Procedure similar to GERM 421. Offered infrequently. Prereq: GERM 311 and 312.

GERM 431: 3 s.h.
The Novelle in German Literature
Lectures on the development and theory of the genre from its beginnings to about 1870. Reading and discussion of outstanding Novellen as examples of a theory and a literary era. Research papers and oral reports. Offered infrequently. Prereq: GERM 311 and 312.

GERM 432: 3 s.h.
The Novelle and the Novel in German Literature
Lectures on the principal authors of Novellen from 1870 to the present day. Historical background of the novel. Reading of representative Novellen and at least one novel. Research papers and oral reports. Offered infrequently. Prereq: GERM 311 and 312.

GERM 460: 3 s.h.
Introduction to Translation and Interpretation
Intended for students with a firm oral and written command of German, who need expert guidance for avoiding the pitfalls inherent in transposing thought from one language to another. Emphasis on idiomatic translation of a variety of text types. Introduction to simultaneous oral interpretation. Offered infrequently. Prereq: GERM 351 and 352.

GERM 470: 3 s.h.
German Linguistics
An introduction to basic concepts and major divisions of modern linguistics as it pertains to the historical development of modern German. Phonetics, phonology, morpohology, syntax and semantics seen both diachronically and synchronically. To be taken before FORL 480. Offered periodically. Prereq: GERM 351 and GERM 352.

FORL 480: 3 s.h.
Teaching of Foreign Languages
Study of current theories of second language acquisition and methods of teaching foreign languages in elementary and secondary school. Students will develop techniques for teaching language for proficiency in all skill areas; planning lessons and units; selecting, adapting and developing materials; assessment; and the use of new technologies. Must be taken simultaneously with EDSE 321 and EDFN 330. Offered in fall only. Prereq: admission to Advanced Professional Studies, GERM 470 or FREN 470 or SPAN 470.

GERM 490: 3 s.h.
See course description under FREN 490.

GERM 498: 1-3 s.h.
Independent Study
For further information on independent study, see the *Special Academic Opportunities* section.

Conversation: no credit
German majors are offered the opportunity to participate one hour per week in a small conversation group with staff supervision.

Special Courses
Graduate German courses listed below are open to undergraduates with recommendation of adviser and consent of instructor: (See the *Graduate Catalog* for course descriptions.) Undergraduate course number on left corresponds with graduate number in parentheses.

GERM 401 (501): 3 s.h.
Modern Methods of Teaching German

GERM 403 (503): 3 s.h.
Activities for Class and Club

GERM 405 (505): 3 s.h.
Introduction to Literature

GERM 407 (507): 3 s.h.
Theater Workshop

GERM 409 (509): 3 s.h.
Applied Linguistics

GERM 416 (512): 3 s.h.
Introduction to Phonetics

GERM 417 (513): 3 s.h.
Advanced Phonetics

GERM 441 (521): 3 s.h.
Functional Grammar Review

GERM 442 (522): 3 s.h.
Composition

GERM 443 (523): 3 s.h.
Stylistics and Composition

GERM 444 (524): 3 s.h.
Translation and Interpretation

GERM 445 (525): 3 s.h.
Advanced Oral Practice and Self-Expression

GERM 446 (541): 3 s.h.
History of the German-Speaking Peoples to the Congress of Vienna

GERM 447 (542): 3 s.h.
History of the German-Speaking Peoples from the Congress of Vienna to the Present

GERM 451 (551): 3 s.h.
Geography of the German-Speaking Countries, Physical and Economic

GERM 461 (561): 3 s.h.
Survey of German Art

GERM 462 (531): 3 s.h.
Evolution of the German Language

GERM 471 (571): 3 s.h.
Aspects of Contemporary Germany

GERM 481 (581): 3 s.h.
Seminar in Medieval German Literature

GERM 482 (582): 3 s.h.
Seminar in the Literature of Humanism and the Reformation

GERM 483 (583): 3 s.h.
Seminar in the Literature of the Baroque Period

GERM 484 (584): 3 s.h.
Seminar in the Literature of the Classical Period

GERM 485 (585): 3 s.h.
Seminar in Nineteenth Century German Literature

GERM 486 (586): 3 s.h.
Seminar in Twentieth Century German Literature

GERM 491 (589): 3 s.h.
Current Topics

Ancient Greek

GREK 101: 3 s.h.
Elementary Greek I (G1)
Grammar and culture studied through readings based on Plato, Herodotus, Thucydides, et al. Preparation for reading classical and New Testament works. Intended for beginners. Offered infrequently.

GREK 102: 3 s.h.
Elementary Greek II (G1)
Continuation of the approach used in the first semester. Readings based on Aristophanes' Birds, Wasps and Lysistrata and Demosthenes' Prosecution of Neaira. Offered infrequently. Prereq: GREK 101.

HUMN 163: 3 s.h.
Latin and Greek Terminology (G1)
A systematic treatment of Latin and Greek components in English words. Study of prefixes, suffixes and roots integrated with the combinative principles, orthography and pronunciation of general and scientific vocabulary. Attention given to the history of the classical element in English. No prior knowledge of Latin and Greek required. Offered infrequently.

HUMN 391: 3 s.h.
Topics in the Humanities (G1, W)
In-depth investigation and development of a topic of current interest not covered in regularly scheduled courses. The topics will vary according to the needs and interests of the students and the faculty involved. Specific topics will be identified by the subtitles each time the course is offered. Course may be taken for credit each time the content (subtitle) is different. Offered periodically. Prereq: ENGL 110.

GREK 201: 3 s.h.
Intermediate Greek I (G1)
Review of elementary materials and progression into advanced forms and syntax. Readings in classical and koine Greek. Offered infrequently. Prereq: GREK 102.

GREK 202: 3 s.h.
Intermediate Greek II (G1, W)
Introduction to Greek literature through a variety of Greek authors, especially Homer's Odyssey, Herodotus and Euripides' Medea. Offered infrequently. Prereq: ENGL 110, GREK 201.

HUMN 202: 3 s.h.
Classical Mythology (G1, W)
Major mythological materials from Greek and Roman civilization. Analysis and interpretation of myth together with its symbolic, allegorical and psychological implications and its treatment in art and literature from classical to modern times. Offered annually. Prereq: ENGL110.

HUMN 240: 3 s.h.
Greek Literature in Translation (G1, W)
The origins of Western culture from the perspective of Greek literature, illustrating the development of ideas from myth to rationalism. A cultural orientation for all degree programs. Course taught in English by an instructor of classical languages. Offered infrequently. Prereq: ENGL110

GREK 311: 3 s.h.
Survey of Literature I
Life and literature of prose writers in the area of history, oratory and philosophy. Offered infrequently. Prereq: GREK 202.

GREK 312: 3 s.h.
Survey of Literature II
Continuation of GREK 311; introduces Greek poetry and metrics. Offered infrequently. Prereq: GREK 311.

GREK 498: 1-3 s.h.
Independent Study
For further information on independent study, see the *Special Academic Opportunities* section.

NOTE: Major works of epic, tragedy, comedy, philosophy, oratory, history and lyric poetry constitute the advanced courses.

Latin

LATN 101: 3 s.h
Elementary Latin I (G1)
Introduction to language and culture of ancient Rome. Study of forms, syntax and idioms. Emphasis on analytical thinking and English vocabulary building. Intended for beginners. Offered in fall.

LATN 102: 3 s.h.
Elementary Latin II (G1)
Continuation of the approach used in the first semester. Supplementary readings in unadapted Latin prose and poetry. Offered in spring. Prereq: LATN 101.

HUMN 163: 3 s.h.
Latin and Greek Terminology (G1)
Latin and Greek components in English words. Study of prefixes, suffixes and roots integrated with the combinative principles, orthography and pronunciation of general and scientific vocabulary. Attention given to the history of the classical element in English. No prior knowledge of Latin and Greek required. Offered infrequently.

HUMN 202: 3 s.h.
Classical Mythology (G1, W)
Major mythological materials from Greek and Roman civilization. Analysis and interpretation of myth together with its symbolic, allegorical and psychological implications and its treatment in art and literature from classical to modern times. Offered annually. Prereq: ENGL 110.

HUMN 250: 3 s.h.
Latin Literature in Translation (G1, W)
Broad literary genres: comedy, epic, lyric and elegiac poetry, satire, oration, essay, letter and historical style, as molded by the Romans from their

Grereq: ENGL 110.

HUMN 253: 3 s.h.
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LATN 202: 3 s.h.
Intermediate Latin II (G1)
Introduction to Latin literature through a variety of classical authors. Offered infrequently. Prereq: LATN 201 or equivalent.

proficiency in both productive (speaking and writing) and receptive (reading and listening) skills. Prereq: ITAL 101 or 1 year h.s. Italian. Offered infrequently.

Japanese (Offered in cooperation with Franklin & Marshall College.)

JAPN 101: 3 s.h.
Elementary Japanese I (G1)
Introduction to language and culture. Fundamentals of grammar and syntax. Oral practice, short readings and practice in aural comprehension. Emphasis on learning useful everyday phrases and working toward accuracy in pronunciation. Offered infrequently.

JAPN 102: 3 s.h.
Elementary Japanese II (G1)
Continuation of JAPN 101; emphasis on more complex syntactical structures while working toward greater proficiency in both productive (speaking and writing) and receptive (reading and listening) skills. Prereq: JAPN 101 or equivalent. Offered infrequently.

JAPN 201: 3 s.h.
Intermediate Japanese I (G1)
Continuation of JAPN 102. Further development of syntactical and phonological structures. Thematic basis for oral and written communication. Builds on proficiency attained in 101-102 sequence. Offered infrequently. Prereq: JAPN 102.

JAPN 202: 3 s.h.
Intermediate Japanese II (G1)
Continuation of JAPN 201. Further development of syntactical and phonological structures. Thematic basis for oral and written communication. Builds on proficiency attained in JAPN 201. Offered infrequently. Prereq: JAPN 201.

Russian (in moratorium but courses are offered in cooperation with Franklin & Marshall College.)

RUSS 101: 3 s.h.
Elementary Russian I (G1)
Introduction to language and culture. Fundamentals of grammar and syntax. Oral and written practice, short readings and practice in aural comprehension. Emphasis is placed on learning useful everyday phrases and working toward accuracy in pronunciation. Offered infrequently.

RUSS 102: 3 s.h.
Elementary Russian II (G1)
Continuation of the introduction to language and culture and further mastery of speaking, comprehension, reading and writing skills. Offered infrequently. Prereq: RUSS 101 or 1 year h.s. Russian.

HUMN 270: 3 s.h.
Russian Literature in English (G1, W)
Representative short readings from major Russian writers, covering 19th and 20th centuries in alternating years. Consideration of themes and characteristics of Russian literature as influenced by history, politics and esthetic currents. Designed primarily as an elective for nonmajors; may be elected by majors with the consent of the adviser as a supplement to the department requirements. Evaluation is by written examinations. Offered infrequently. Prereq: ENGL 110.

HUMN 370: 3 s.h.
Russian Folk Culture (P)
An examination of Russian culture up to about 1700 with Peter the Great's moves toward Westernization; the essence and foundations of the Russian world view as conditioned by events and as reflected in religion, arts and crafts, folklore, oral and written literature, daily life and rites of passage. Requirements include a crafts project, papers on aspects of folklore and literature and written examination. A useful course for education majors. Knowledge of Russian is not required. Offered infrequently. Prereq: ENGL 110, junior status.

HUMN 391: 3 s.h.
Topics in the Humanities (G1, W)
In-depth investigation and development of a topic of current interest not covered in regularly scheduled courses. The topics will vary according to the needs and interests of the students and the faculty involved. Specific topics will be identified by the subtitles each time the course is offered. Course may be taken for credit each time the content (subtitle) is different. Offered periodically. Prereq: ENGL 110.

RUSS 201: 3 s.h.
Intermediate Russian I (G1)
Further development of reading, writing, comprehension and speaking skills and basic grammar, using contemporary cultural and situational material. Offered infrequently. Prereq: RUSS 102 or 3 years of h.s. Russian.

RUSS 202: 3 s.h.
Intermediate Russian II (G1)
Continued development of the skills nurtured in 201. Emphasis on communication in speech and writing and improved control of grammatical structures, as well as increased vocabulary for daily life and reading. Offered infrequently. Prereq: RUSS 201 or 4 years of h.s. Russian.

SPAN 361 and 362: 3 s.h. each
Oral Spanish I and II
Intensive experience with the spoken language. Taped exercises in comprehension. Conversations concerning everyday life, with emphasis on appropriate vocabulary. Emphasis on modern society and customs; schools, sports, holidays, literature, etc. Remedial treatment of phonetics and grammar. Offered in spring. Prereq: SPAN 351 or equivalent.

HUMN 380: 3 s.h.
Latino Issues of Identity (P)
Critically examines a variety of poetry, fiction, short stories and essays produced by U.S. Latino/a writers and artists. Analysis of films and newspaper clippings related to the Latino experience will be discussed. Texts examined will be approached not as isolated words on a page, but as part of a living culture with a rich historical context. Interdisciplinary in nature, combing literature with history and cultural studies, but also comparative, since the diversity of cultures will be explored under the rubric of “Latino,” which includes Chicanos, Puerto Ricans, Cubans and Dominicans, among others. Knowledge of Spanish not necessary. Offered periodically. Prereq: ENGL 110, junior ststus.

HUMN 391: 3 s.h.

SPAN 460: 3 s.h.
Introduction to Translation and Interpretation
Intended for students with a firm oral and written command of Spanish, who need expert guidance for avoiding the pitfalls inherent in transposing thought from one language to another. Emphasis on idiomatic translation of newspaper and magazine articles. Offered in spring. Prereq: SPAN 351 and 352.

SPAN 470: 3 s.h.
Spanish Linguistics
Introduction to Spanish phonetics. Comparative study of the morphology and the syntactic structures of Spanish and English. To be taken before FORL 480. Offered in fall. Prereq: SPAN 351 and 352. Recommended: SPAN 361.

FORL 480: 3 s.h.
Study of current theories of second language acquisition and methods of teaching foreign languages in elementary and secondary schools. Students will develop techniques for teaching language for proficiency in all skill areas; planning lessons and units; selecting, adapting and developing materials; assessment; and the use of new technologies. Must be taken simultaneously with EDSE 321 and EDFN 330. Offered in fall. Prereq: admission to advanced professional studies, SPAN 470 or FREN 470 or GERM 470.

SPAN 490: 3 s.h.
See course description under FREN 490.

SPAN 498: 1-3 s.h.
Independent Study
For further information on independent study, see the *Special Academic Opportunities* section.

Conversation: No credit
Spanish majors are offered the opportunity to participate on a regular basis in a small conversation group under staff supervision.

NOTE: The graduate courses in Spanish listed below are open to undergraduates with the recommendation of adviser and consent of instructor. (See the *Graduate Catalog* or course descriptions.) Undergraduate course number on left corresponds with graduate course number in parentheses.

SPAN 401 (501): 3 s.h.
Modern Methods of Teaching Spanish

SPAN 403 (503): 3 s.h.
Activities for Class and Club

SPAN 409 (509): 3 s.h.
Applied Linguistics

SPAN 416 (512): 3 s.h.
Introduction to Phonetics

SPAN 417 (513): 3 s.h.
Advanced Phonetics

SPAN 441 (521): 3 s.h.
Functional Grammar Review

SPAN 442 (522): 3 s.h.
Composition

SPAN 443 (523): 3 s.h.
Composition and Stylistics

SPAN 444 (524): 3 s.h.
Translation and Interpretation

SPAN 445 (525): 3 s.h.
Advanced Oral Practice and Self-Expression

SPAN 446 (541): 3 s.h.
History of Spanish Civilization

SPAN 447 (542): 3 s.h.
History of Spanish-American Civilization

SPAN 451 (551): 3 s.h.
Geography of Spain, Physical and Economic

SPAN 452 (552): 3 s.h.
Spanish-American Geography

SPAN 461 (561): 3 s.h.
History of Hispanic Art

SPAN 462 (531): 3 s.h.
Evolution of the Spanish Language

SPAN 471 (571): 3 s.h.
Aspects of Contemporary Spain

SPAN 472 (572): 3 s.h.
Aspects of Contemporary Latin America

SPAN 481 (581): 3 s.h.
Seminar in Medieval Spanish Literature

SPAN 482 (582): 3 s.h.
Seminar in Renaissance Literature

SPAN 483 (583): 3 s.h.
Seminar in Golden-Age Literature

SPAN 484 (584): 3 s.h.
Seminar in Eighteenth-Century Literature

SPAN 485 (585): 3 s.h.
Seminar in Nineteenth-Century Literature

SPAN 486 (586): 3 s.h.
Seminar in Twentieth-Century Literature

SPAN 487 (587): 3 s.h.
Seminar in Spanish-American Literature

SPAN 491 (589): 3 s.h.
Current Topics

FRENCH

See Foreign Languages

GEOGRAPHY

School of Humanities and Social Sciences

Associate Professor Cuthbert, chairperson
Professor Shanahan
Associate Professors Geiger, Schreiber, Thompson
Assistant Professor Kelly

Geography is the study of how people relate to their natural and human surroundings. Geography is a bridge discipline: an environmental science which brings together principles of physical sciences and other social sciences; a social science which looks at the spatial characteristics of culture, history, politics, economies and business decisions; and a liberal arts discipline which provides background for study in art, languages, literature, music, education and many other subjects. Geographers can bring to analyses of current issues an understanding of global interrelationships and specialized map-related skills. Many geographers develop professional skills in map interpretation, cartography and computer-based mapping and analysis. Geographic understanding and skills create the potential for employment in such diverse areas as planning and other government agencies, environmental and cartographic service companies and the business community. Contact the department chairperson for more detailed information on career opportunities.

The liberal arts program in geography offers emphases in environmental studies, global studies and geospatial applications for geography majors and minors. A minor in geography brings an added dimension to any major and current geography minors hold majors in many different University departments. The program in secondary education, providing certification for social studies teaching with a geography emphasis, is also serving a growing demand. Every student will benefit from the liberal arts value of the introductory and regional geography courses.

COURSE REQUIREMENTS

Geography Major (B.A.): 120 s.h.
Environmental Studies Option
GEOG 120, 202, 230, 281; three from GEOG 20x, 30x, 23x, 33x, 43x or GEOG 372; one from GEOG 22x; one from GEOG 24x, 34x, 44x; 300 or 488; 6 s.h. in geography electives. Required related courses: MATH 130 or 235; an approved minor.

Geography Major (B.A.): 120 s.h.
Global Studies Option
GEOG 120, 227, 230, 241, 281; two from GEOG 22x, 301, 32x; two from GEOG 24x, 34x, 44x; GEOG 300 or 488; 6 s.h. in geography electives. Required related courses: MATH 130 or 235; an approved minor.

Geography Major (B.A.): 120 s.h.
Geospatial Applications Option
GEOG 120, 230, 281, 292, 295, 297, 372; one from GEOG 28x, 29x, 38x, 39x; two from GEOG 278, 304, 305, 306, 336; one from GEOG 14x, 24x, 34x, 44x; 300 or 488; 3 s.h. in geography electives. Required related courses: MATH 130 or 235 and MATH 151 or 160; an approved minor.

Social Studies Major (B.S.Ed.): 120 s.h.
This program is designed for students planning to teach economics, geography, government or history. The program consists of 30 s.h. of required core courses, two in economics, geography and government and four in history. In consultation with an academic adviser, each student will select a concentration totalling 30 s.h. from among the following disciplines: anthropology (0-6), economics (3-15), geography (3-15), government (3-15),

history (3-15), psychology (0-6) and sociology (0-6). Economics, geography, government and history courses should be at the 200-level or higher. Students who concentrate in geography are highly encouraged to take 15 s.h. in geography. The program also consists of 27 s.h. of professional education courses, two math courses and two courses in the humanities or sciences that support the concentration.

Students wishing to teach anthropology, psychology or sociology in the secondary schools are required to complete the B.S.Ed. As part of that program the students should select a number of courses in anthropology, sociology and psychology to prepare for the certification exams in the social sciences. Additional courses beyond the social studies program may be necessary. Upon receiving certification, students can take the test for Social Sciences Certification which will allow them to teach anthropology, psychology and sociology.

The professional education courses required are: EDFN 211, 241 and 330; EDSE 321, 433 and 461.

Geospatial Applications Minor:
18 credits minimum including GEOG 101, 281, 295; two of GEOG 120, 222, 226, 227, 230, 278, 292, 384; and one 300-level Regional Geography course.

Environmental Geography Minor:
18 credits minimum including GEOG 101, 202, 230, 281 and two geography electives at the 300-400 level.

Global Geography Minor:

GEOG 248: 3 s.h.
Geography of Africa (G3)
The course uses a thematic approach to examine many of the sub-fields of geography as they pertain to Africa. Topics include the physical landscape, climate, vegetation, environmental issues, pre-colonial and colonial history, politics, culture, population, urbanization, agricultural and economic development, and medical gender issues. Offered periodically.

GEOG 278: 3 s.h.
Transportation Geography (G3)
Transportation is defined as the movement of goods and people from place to place. This course introduces the principles underlying these movements with discussion of the economic, social and environmental impacts. Offered periodically.

GEOG 281: 3 s.h.
Map Interpretation and Analysis (G3)
Introduction to maps as the basic analytical tool of geographers. Map reading, measurement, interpretation and basic spatial data collection and analysis are examined in the contexts of general map use and of geographic research. Offered in fall, spring.

GEOG 292: 3 s.h.
Quantitative and Spatial Analysis (G3)
Advanced spatial analytical techniques in a computer environment. Data collection methods and sources are reviewed. Descriptive and inferential statistical methods are surveyed and are applied to spatial analytical problem solving. Offered periodically. Prereq: GEOG 281.

GEOG 295: 3 s.h.
Geographic Information Systems
Introduction to Geographic I2fic I2O iy(ystems)Tj/T11ic Geographic I2O 1(enctu,Tsi1(d(hsP(issuphic)Tje1nvi)TjIdsi(hsP().187 a687 Tsses)2endwith 87 T)-587 Tg

GEOG 343: 3 s.h.
Latin America (P)
Study of contemporary economic, social and environmental issues. Topics like population growth, land use changes, industrialization, urbanization and regional ecological changes are discussed. Offered periodically. Prereq: ENGL 110; GEOG 101, 141, 220 and junior status.

GEOG 344: 3 s.h.
North America (G3, W)
Introduction to geography of the U.S. and Canada using the tools and concepts of regional geography. Various physical, population and economic patterns are analyzed and regional social and environmental issues addressed. Offered in fall, spring. Prereq: ENGL 110.

GEOG 346: 3 s.h.
Pacific Asia (G3, W)
Examination and comparison of environmental, social/cultural, economic and political issues in the Pacific Asian region; contrasts between developed Japan and less developed countries of East and Southeast Asia; role of the region in the global economy. Offered infrequently. Prereq: ENGL 110.

GEOG 350: 3 s.h.
Global Issues (G3)
Issues related to urban, cultural and resource problems are analyzed globally. Emphasis on spatial nature of these problems and emerging global interdependence. Focus on a single current issue, which will be identified in advertised course title. Offered periodically.

GEOG 372: 3 s.h.
Urban and Regional Planning (G3)
Introduction to land use and other types of planning in urban and rural areas. Assessment of development suitability and environmental impact. Techniques for implementing different types of plans. Offered annually.

GEOG 384: 3 s.h.
Cartography
Introduction to concepts and techniques of map making. Skill developed in computer-based compilation, layout, drawing and lettering of maps. Offered periodically. Prereq: GEOG 281, 295.

GEOG 395: 4 s.h.
Advanced GIS
Advanced experience with Geographic Information Systems (GIS) concepts and software. Emphasis on environmental and planning applications and organizational consideration. Offered periodically. Prereq: GEOG 295 or ESCI 281.

GEOG 488: 3 s.h.
Senior Thesis
Investigation of selected topic with individual research assignment; focus varies but related to environmental analysis. Prereq: Senior standing and completion of basic courses. Offered as needed.

GEOG 489, 499: 1-3 s.h.
Honors Courses/Thesis
Investigation of selected topic with individual research assignment; focus varies but related to environmental analysis. Prereq: Senior standing and completion of basic courses and eligibility for departmental honors. See *Special Academic Opportunities, Departmental Honors* section of this catalog.

GEOG 498: 3 s.h.
Independent Study in Geography
Investigation of selected topic with individual research assignment; focus varies but related to environmental analysis.

GEOLOGY

See Earth Sciences

GERMAN

See Foreign Languages

GERONTOLOGY

Professor Gregoire, Coordinator

The interdepartmental minor in gerontology is intended to help prepare students to function at the entry level in the rapidly developing field of services to the aging and to relate and work with elderly people in general social and work environments. In combination with any of several baccalaureate degrees, it facilitates an appreciation of the special strengths and needs of the elderly and the range of services and problems that relate to them.

Course Requirements

Interdepartmental Minor in Gerontology: 18 s.h.
GERT 100, GERT 210, NURS 350, PSYC 229, SOWK 306; 1 of the following courses: GERT 300/301, PHIL 280, SOCY 214. Other topics courses approved by the program coordinator.

Course Descriptions

GERT 100: 3 s.h.
Interdisciplinary Introduction to Gerontology (G3)
An introduction to the field of aging and examination of the physiological, sociological, psychological and economic perspectives. This course also focuses on problems of the aged at levels of self, interactions with others and the broader societal context.

GERT 210: 3 s.h.
Aging and the Law (G3, W)
Introduction to legal concepts and thinking. Study of the laws, regulations, social policies and psychological factors that affect delivery of services to the elderly in area of economic security, employment, health care, wills, mental health, housing, criminal justice, consumer protection. Offered periodically. Prereq: ENGL 110.

GERT 300/301: 3 s.h.
Field Practicum
Supervised practicum at cooperating agencies and organizations active in serving elderly, for a minimum of 150 hours (10hrs/week). Involvement in meeting physiological and/or psychological and/or social needs of the elderly. Prereq: GERT 100 and at least 30 s.h. of general education and gerontology courses. Faculty involvement in and approval of practicum plan. Malpractice liability insurance required.

GOVERNMENT AND POLITICAL AFFAIRS

School of Humanities and Social Sciences

Professor Glenn, chairperson
Professors K. Bookmiller, Lee
Associate Professors R. Bookmiller, Greenawalt
Assistant Professor Lawrence

The Department of Government and Political Affairs offers a liberal arts major and minor. Departmental honors option is available to qualified majors, as are pre-law advising and internship opportunities.

COURSE REQUIREMENTS

Government and Political Affairs (B.A.): 120 s.h.
Complete both A and B:

A. 33 s.h. in government and political affairs, including 15 s.h. at the 300 level or above. Students must complete GOVT 111: Introduction to American Government, GOVT 221: Introduction to Comparative Political Systems, GOVT 231: Introduction to Political Theory, GOVT 251: Introduction to Global Affairs.

Students should check the course description portion of the catalog for prerequisites and recommended courses.

It is recommended that students planning graduate or other advanced study in government and political affairs complete GOVT 301: Political Research Skills and Methods.

B. Students must complete any University approved minor (18 s.h.). A second major will also fulfill this requirement.

Social Studies Major (B.S.Ed.): 120 s.h.
This program is designed for students planning to teach economics, geography, government or history. The program consists of 30 s.h. of required core courses, two in economics, geography and government and four in history. In consultation with an academic adviser, each student will select a concentration totalling 30 s.h. from along the following disciplines: anthropology (0-6), economics (3-15), geography (3-15), government (3-15), history (3-15), psychology (0-6) and sociology (0-6). Economics, geography, government and history courses should be taken at the 200-level or higher. Students who concentrate in government are highly encouraged to take 15 s.h. in government. The program also consists of 27 s.h. of professional education courses, two math courses and two courses in the humanities or sciences that support the concentration.

Students wishing to teach anthropology, psychology or sociology in the secondary schools are required to complete the B.S.Ed. As part of that program the students should select a number of courses in anthropology, sociology and psychology to prepare for the certification exams in the social sciences. Additional courses beyond the social studies program may be necessary. Upon receiving certification, students can take the test for Social Sciences Certification which will allow them to teach anthropology, psychology and sociology.

The professional education courses required are: EDFN 211, 241 and 330; EDSE 321, 433 and 461.

Government & Political Affairs Minor: 18 s.h.

18 s.h. with at least one course in each of the two following areas: American politics and national/comparative politics. 6 s.h. at the 300 level or above are required.

COURSE DESCRIPTIONS

GOVT 101: 3 s.h.
Introduction to Political Studies (G3)
Fundamental problems of politics and government. The of human beings cise of power and influence, conflict, political leadership and political groups. Offered

GOVT 111: 3 s.h.
Introduction to American Government (G3)
Introduction to the major tenets of the American political system. Offered in fall, spring.

GOVT 112: 3 s.h.
Introduction to State and Local Government (G3)
The federal system and state and local governmental problems. Emphasis on Pennsylvania when possible. Offered in fall, spring.

GOVT 205: 3 s.h.
Introduction to Public Policy (G3)
Decision making by governments in response to public problems. The policy process. Current policy issues, selected from such possible examples as education, abortion, energy and environment. Some problems of policy evaluation. Offered in fall, spring.

GOVT 215: 3 s.h.
The American Presidency (G3, W)
Examination of the presidency and the executive branch of national government. Emphasis on the growth and development of presidential power. Offered in spring. Prereq: ENGL 110.

GOVT 221: 3 s.h.
Introduction to

GOVT 333: 3 s.h.
American Political Thought
Study of the history and development of democracy in an American setting. Emphasis on different and often conflicting versions of democratic theory and practice. Offered in fall. Recommended: GOVT 231.

GOVT 341: 3 s.h.
Introduction to City Planning (P)
Study of the dynamics of human settlement patterns in the country and abroad. Examine public policy alternatives regarding land use and development patterns. Introduce methods and techniques used in designing settlement systems and study values reflected in human settlement patterns. Offered every other spring. Prereq: ENGL 110 and junior status.

GOVT 351: 3 s.h.
International Law
Classical sources and recent developments in international law. Evaluation of law in the context of world politics. Offered in fall. Recommended: GOVT 251.

GOVT 352: 3 s.h.
International Organizations (G3)
Study of various intergovernmental and nongovernmental associations representing a number of multinational groupings serving humanitarian, economic and security functions. Emphasis on organizations such as the United Nations and the European Union. Offered in spring. Recommended: GOVT 251.

GOVT 355: 3 s.h.
American Foreign Policy (G3)
Institutional and historical overview of American foreign policy. Formal, informal and institutional sources of foreign policy. Emphasis on post-WWII presidential administrations. Offered in fall. Recommended: GOVT 111 or GOVT 251.

GOVT 361: 3 s.h.
The Politics of Race and Ethnicity (G3)
Examination of the role of racial and ethic minority groups in American politics and government. Focus on political resources and political status of minority groups in America, minority group representation and participation in American politics, the racial divide in American public opinion, racial politics in America's cities and strategies of minority political empowerment. Offered in spring. Prereq: GOVT 111.

GOVT 408: 3 s.h.
Seminar in Political Science
Analysis of critical problems in the discipline. Research and preparation of a written report. Seminar may be taken for credit more than once provided content is different each time. Offered periodically.

GOVT 411: 3 s.h.
Constitutional Law I: Separation of Powers and Federalism
Focus on the allocation of power between branches 8(edifg-70ong)fg-levels of government/vorng utioE (:)TjTjEMC (cience)Tj/T11 1 TfT*[(Analy).deeS1 1 Tf nna

HIST 210: 3 s.h.
Women and Western Civilization (G3)
History of women in Europe. Ideas about women, education, suffrage and feminist movements, economic and family roles. Offered periodically.

HIST 221: 3 s.h.
England to 1688 (G3)
Medieval, Tudor and Stuart England: The political, social, economic and cultural development of England from early medieval times to 1688. Offered annually.

HIST 222: 3 s.h.
Modern Britain (G3)
Modern England: the political, social, economic and cultural evolution of England from 1688 to the present. Offered annually.

HIST 223: 3 s.h.
Traditional Germany (G3, W)
The evolution of the German people and their political, cultural and socio-economic institutions from Roman times to 1806. Offered annually. Prereq: ENGL 110.

HIST 224: 3 s.h.
Modern Germany (G3, W)
German history from 1806 to the present. Offered annually. Prereq: ENGL 110.

HIST 241: 3 s.h.
Imperial Russia
Political, cultural, economic and social history from Peter the Great to the Russian Revolution. Offered annually.

HIST 242: 3 s.h.
Soviet Union (G3)
Political, cultural, economic and social history from the Russian Revolution to the present. Offered in spring.

HIST 244: 3 s.h.
History of Eastern Europe
The historical development of the nations of East Central Europe in their larger European context. Offered in fall of even years.

HISTORY 250: 3 s.h.
Women in U.S. History (G3, W)
History of women in the United States from the early 16th century through the late 20th century, with a particular emphasis on the significance of race, class, religion and region in the shaping of women's experiences. Offered periodically. Prereq: ENGL 110.

HIST 251: 3 s.h.
History of Violence in the United States (G3)
The historical roots of violence as well as the social and cultural significance of violence in American history. Offered periodically.

HIST 255: 3 s.h.
Religion in American History (G3)
The role of religion in American history and society from Native American beginnings and European colonization through the 20th century. Offered periodically.

HIST 260: 3 s.h.
History of Pennsylvania (G3)
Historical development and contributions of Pennsylvania from colonial beginnings to present. Offered annually.

HIST 270: 3 s.h.
History of American Political Parties (G3)
Formation/historical analysis of American political parties. Offered periodically.

HIST 271: 3 s.h.
The American Presidency (G3)
A historical study of the growth and development of presidential leadership and power. Offered periodically.

HIST 272: 3 s.h.
African-American History I (G3, W)
History of African Americans from their first arrival in the Americas through the Civil War, with a particular emphasis on the process of enslavement, the formation of African American communities and institutions and the evolution of Black abolitionism. Offered annually. Prereq: ENGL 110.

HIST 273: 3 s.h.
African-American History II (G3, W)
History of African Americans from the Civil War through the present, with a particular emphasis on the processes of emancipation, urbanization and enfranchisement. Offered annually. Prereq: ENGL 110.

HIST 276: 3 s.h.
History of American Foreign Relations, 1890 to the Present (G3, W)
With the rise of the United States as an international power in the 1890s through its current foreign policy initiatives, it has acted as a leader in the world community. This course examines the rise, decline and resurrection of the United States as a world power through its foreign relations. Offered periodically. Prereq: ENGL 110.

HIST 357: 3 s.h.
Modern U.S. History (G3)
The United States from 1919 to present. Offered annually.

HIST 360: 3 s.h.
The Second World War (G3)
The course focuses on the military strategy and tactics employed by the combatants during the Second World War (1939-1945). Offered annually.

HIST 380: 3 s.h.
U.S.-Latin American Relations (G3)
Traces the historical evolution of the inter-America organizations. Emphasis on U.S.-Latin American relations. Offered infrequently.

HIST 381: 3 s.h.
History of West Africa to 1800 (G3, W)
Explores the internal dynamics of state formation in the medieval era, the development of socio-political and economic institutions, as well as, the development and impact of such external factors as Islam, Christianity and the transatlantic slave trade. Offered annually. Prereq: ENGL 110.

HIST 401: 3 s.h.
Cultural Interactions in the Atlantic World, 1450-1820 (P)
This perspectives course will compare the social, economic, political and religious relations of three areas: Africa, Europe and the Native Societies of the Americas in and during the period of the formation of the Atlantic World. Offered periodically. Prereq: ENGL 110 and junior status.

HIST 406: 3 s.h.
Senior Seminar
Students will prepare and defend a seminar paper of approximately 25 pages. Seminar will be offered in the fall semester with a United States history theme and in the spring semester with a world history theme. Limited to students who have completed at least 24 credit hours of history courses or by permission of the instructor. (Satisfies advanced writing [AW] requirement if a grade of B or higher attained.)

HIST 410: 3 s.h.
European Cultural and Intellectual History (G3)
History of European philosophy, political and social thought, the arts and literature from the Enlightenment to the present. Offered in fall of even years.

HIST 453: 3 s.h.
Colonial PA German Society (P)
Early Pennsylvania became home to a variety of groups in the course of the 18th century. This course takes a transatlantic approach as it explores

HIST 502
Readings in United States History, 1815-1919

HIST 503
Readings in United States History 1919 to the Present

HIST 505
Readings in Early Modern Europe, 1500-1789

HIST 506
Readings in the European Age of Revolution, 1789-1914

HIST 507
Readings in Modern Europe, 1914 to the Present

HIST 508
Readings in Regional History

HIST 510
Topics in United States History

HIST 511
Topics in European History

HIST 512
Topics in Regional History

HONORS COLLEGE

Professor Dennis B. Downey, director

Regulations governing admission, retention and graduation in the University Honors College are found in the *Special Academic Opportunities* section.

COURSE REQUIREMENTS

To graduate in the University Honors College, students must demonstrate competence in English composition and either statistics or calculus. They are required to take either SSCI 201-H or 202-H, either ENGL 238-H or 239-H, an honors laboratory science course, an honors perspectives course, at least nine hours of honors electives and HNRS 489/499 (Honors Independent Study and Senior Thesis or departmental honors thesis equivalent). Students must pass honors courses with grades of B- or higher to receive honors credit for their work. A minimum of 30 credit hours of honors classes and a cumulative GPA of 3.35 is required to graduate in the Honors College.

SELECTED COURSE DESCRIPTIONS

The Honors College and the academic departments cosponsor courses in 48(in)-PA of 3.35 is required to graduate in the Hoe0c/Actsis c/Actsi-25( )-49(acad

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or better in both CHEM 112 and CHEM 113 will result in honors designation for the pair. The pair of courses counts as one entry in the science component of general education and results in 5 hours of general education credit. 1 hr. discussion. Coreq: concurrent registration in CHEM 112 is required. Prereq: CHEM 111 grade B- or higher and consent of Honors College Committee.

CHEM 372H: 3 s.h.
The History of Chemistry and Society
The history of the development of the science of chemistry from its roots in Egyptian and Greek societies through its specialization in the early

HUM

INDUSTRY & TECHNOLOGY

School of E

improvement of the program is guided by an advisory committee of safety professionals. Graduates of this program typically

- Required Related Courses (15-18 credits): Science (6-8 credits): CHEM 101, 103, 104, 205, PHYS 103, 131 or 132 [Note: NFMT option requires CHEM 104 or 111]; Mathematics (6-7 credits): MATH 130 and MATH 151, 160, 161 or 236; and ENGL 312 or 316.
- Recommended Perspectives Course: ITEC 301 or 302.

Industrial Technology Minor: 18 s.h.
Select one of the following Industrial Technology options:

- CADD: ITEC 241, 342 and four of ITEC 243, 343, 344, 345, 346, 445, 446 or 448.
- Construction: ITEC 130, 241, 271, 331, 332 and 433.
- Electronics/Control Systems: ITEC 120, 261, 262, 325, 364 and 467.
- General Industrial Technology: ITEC 110, 120, 130 and three additional ITEC laboratory courses (two required at 300 level or above).
- Graphic Communications: ITEC 110, 251 and four of ITEC 243, 343, 350, 355, 356, 455 or 456.
- Manufacturing: ITEC 130, 271, 281; two of ITEC 375, 376 or 382(486) and one of ITEC 476, 483 or 485.
- Mechanical Technology: ITEC 120, 130, 241, 261 and two of ITEC 325, 326, 336, 342, 425, 445, or 448.

Occupational Safety and Environmental Health (OSEH) Major (B.S.): 120 s.h.
OSEH Courses (44 credits required): OSEH 120, 220, 221, 320, 321, 323, 333, 410, 422, 435 and 440.

Required Related Courses (221, jPSEH 2THrQ9 E(B quired): OS1, jP1EH

ITEC 130: 3 s.h.
Production Materials and Processes
The integration and interrelationships of materials and processes for construction and manufacturing, including the application of math and scientific principles and the technological impacts on industry and society. Requires experiences in materials processing and production tooling. 2 hrs. lec., 3 hrs lab. Offered fall, spring.

ITEC 135: 3 s.h.
Production Systems
Student-centered analysis of goals, inputs, processes and outputs of manufacturing and construction systems. In-plant activities emphasized. Organizational structures and management strategies studied through the simulated organization and operation of a manufacturing and/or construction enterprise. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 110, ITEC 120 (may be taken with) and ITEC 130.

ITEC 140: 3 s.h.
Bio-Related Technologies
Agriculture, medicine and other technologies in which living organisms are used to solve problems and modify products and systems. Includes problem-solving, design, and research activities for understanding bio-related technologies, issues, and impacts. 2 hrs. lec., 3 hrs. lab. Offered fall, spring.

ITEC 241: 3 s.h.
Drafting Communications
Introductory technical sketching, conventional drafting and computer-aided drafting (CAD). Experiences with equipment use and care, lettering, geometric constructions, multiview projection, dimensioning, sectioning, and pictorial representation. 2 hrs. lec., 3 hrs. lab. Offered fall, spring.

ITEC 243: 3 s.h.
Technical Sketching and Design
Freehand sketching, shading and basic elements of two-dimensional design. Includes elements and principles of design, methods of designing and evaluation and design of products and introduction to technical illustration. 2 hrs. lec., 3 hrs. lab. Offered fall.

ITEC 245: 3 s.h.
Descriptive Geometry
Advanced engineering graphics with an emphasis on basic descriptive geometry, surface development drawings, intersection of solids and pictorial projection systems. 2 hrs. lec., 3 hrs. lab. Offered periodically. Preq: ITEC 241.

ITEC 251: 3 s.h.
Print Media Systems
Contemporary resources, processes and impacts of graphic reproduction. Emphasis on workflows relative to offset lithography, flexography, gravure, digital printing and screen printing. Covers graphic design, digital image composition, digital photography, scanning, prepress, press and post-press production. 2 hrs. lec., 3 hrs. lab. Offered fall, spring.

ITEC 261: 3 s.h.
Electronic Systems
Survey of electricity and electronics, including typical direct current and alternating current applications, safe practices and technological impacts. Experiences include breadboarding, design and problem solving, use of test equipment and electronic project assembly/troubleshooting. 2 hrs. lec., 3 hrs. lab. Offered fall, spring.

ITEC 262: 3 s.h.
Semiconductor Electronics
In-depth study of semiconductor theory, including diodes, transistors and silicon-controlled rectifiers. Emphasizes digital, linear and hybrid integrated circuits. Covers surface mount and emerging technologies, such as nanotechnology and biotechnology. Practical applications include prototyping circuits, design and problem solving, use of test equipment and troubleshooting. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 261 or permission of instructor.

ITEC 271: 3 s.h.
Processing Nonmetallic Materials
Various nonmetallic materials, processes, products and impacts, including polymers, ceramics, wood, clay, composites and glass. Instruction and experiences provided on safety and the use of tools and machines associated with nonmetallics. Includes production activities in each of the specified nonmetallic material areas. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 130.

ITEC 281: 3 s.h.
Processing Metallic Materials
Design, manufacturing and assembly of metallic products. Covers metallic material properties, metallurgy, heat treatment, alloying and impacts. Scientific and mathematical concepts are stressed to transform metallic materials into useful products. Includes safe utilization of associated tools and machines. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 130.

ITEC 301: 3 s.h.
Technology and Its Impact on Humans (P)
Analysis of the development of technology and its impact on humans and a realization of the importance of human technological behavior on the environment, social/cultural systems and the future. Students use analytical skills on a written independent research project and oral skills to present and defend positions on technological problems facing our society. Prereq: ENGL 110 and junior status.

ITEC 302: 3 s.h.
Futurology: Technology, Society and Change (P)
A nontechnical interdisciplinary course to help students identify and analyze forces causing technological and social change. Using an understanding of the processes of technological and social change and research techniques for forecasting the future, students complete a written independent research project. Develops skills to project future technological and social developments and their impacts. Offered periodically. Prereq: ENGL 110 and junior status.

ITEC 325: 3 s.h.
Power Conversion and Control

ITEC 363: 3 s.h.
Analog Electronics
Theory and applications to develop concepts in the use of both discrete and integrated components. Includes transistors, diodes, thyristors, operational amplifiers, timers, phase-locked loops and voltage regulators. Amplifiers, oscillators and other applications featured. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 262 or permission of instructor.

ITEC 364: 3 s.h.
Digital Electronics
Practical applications of digital logic for processing electronically encoded information. Covers numbering systems, logic design, basic gates, sequential and combination logic, and digital troubleshooting. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 262 or permission of instructor.

ITEC 375: 3 s.h.
Polymer and Ceramic Technology
Design, development and production of polymer and ceramic products. Covers contemporary pattern and molding materials along with industrial forming processes. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 271jEMC (igital)Tj/Span<ActualText<FEFF0045>BDC (E)TjEMC (lectr)18(onics)]TJ/T1_
P40T-40P40P40rial-40-aielect40sysct40CAD).140leccandut18(o)14ielectnuf/T1uratterCAM).1Tcnuf/T1uratterand polymer and ceSt39(sysct[Design,)14(dev)18

ITEC 448: 3 s.h.
Machine Tool Design
Analysis, planning, design, construction and application of tools, methods and procedures necessary to increase manufacturing productivity.

OSEH 321: 4 s.h.
Environmental and Industrial Hygiene I
Fundamental theory and methods used in identifying, evaluating and controlling the health risks of chemical contaminants and biological agents. Includes coverage of toxicology, exposure standards, medical surveillance, toxic air emissions, air sampling techniques, air pollution control, and protective equipment. Offered fall. Prereq: MATH 101 or equivalent, OSEH 120, CHEM 104.

OSEH 323: 3 s.h.
Human Factors in OSEH
Ergonomic study of interaction between people and their work. Emphasis on the application of biological sciences to engineering principles in an effort to optimize efficiency, productivity and safety. Topics include anthropometrics, biomechanics, design principles, physiological and cognitive capabilities and task evaluation techniques. Offered spring. Prereq: OSEH 120 or permission of instructor.

OSEH 333: 3 s.h.
Introduction to System Safety
Qualitative and quantitative system safety methods used to analyze and control risk. Includes a variety of analytical engineering techniques that are applied to practical system analysis problems. Offered fall. Prereq: OSEH 320 and Math 130.

OSEH 410: 3 s.h.
Safety and Environmental Health Program Management
Principles and practices of occupational safety and environmental health management. Includes the development of safety objectives and policy, evaluation and management of risk and program implementation and evaluation. Offered annually. Prereq: OSEH 220 and 320 or permission of instructor.

OSEH 422: 4 s.h.
Environmental and Industrial Hygiene II
Fundamental theory and methods used in the evaluation and control of the physical agents of noise, ionizing and nonionizing radiation and thermal stress. Covers regulatory standards, control technology, industrial and general ventilation and compliance methods related to indoor air quality, water quality, industrial waste and environmental management programs. Offered spring. Prereq: PHYS 132, OSEH 321 or permission of instructor.

OSEH 430: 3 s.h.
Topics in Occupational Safety and Environmental Health
Investigation of one or more topics that vary according to needs and interests of students and staff. Offered periodically. Prereq: Senior OSEH majors and practitioners or permission of instructor.

OSEH 435: 3 s.h.
Environmental Technology

society, politics and business. The international studies major and minor emphasize comparative social, cultural, economic, environmental, historical and political systems worldwide. Comparative studies of music, literature, religion and education also are offered. Through these studies, students acquire knowledge and tools that enable them to analyze and understand the complex world in which we live.

COURSE REQUIREMENTS

International Studies Major (B.A.): 120 s.h.
A. Major Field Requirements: 39 credits

1. Required courses (6 s.h.): INTL 201 and INTL 488.
2. Required core courses (12 s.h.): ANTH 121, ECON 203, GEOG 101, GOVT 251.
3. International Studies Electives (12 s.h.): Students choose two from the following four areas and take two courses from each area:
   Comparative Societies
   Economic Interdependence
   Global Environmental Issues
   International Relations
4. Area Studies Electives (9 s.h.): Students choose one of the following areas and take three courses from that area:
   African Area Studies
   American Area Studies
   Asian Area Studies
   European Area Studies

NOTE: Consult the Curriculum sheet or DARS for course listings in the elective and area studies and for distribution requirements.

B. Required Related Courses: 18 Foreign Language Credits
Students are required to minor in one approved foreign language offered by the Department of Foreign Languages. (If a student is eligible to use English to satisfy the foreign language component, the foreign language requirement is waived.)

Students desiring more in-depth study of particular topics may register for INTL 491: Topics in International Studies (1-6 s.h.) and INTL 498: Independent Study (1-6 s.h.). Students also may register for seminar, topics and contemporary issues courses from various departments that change from semester to semester. These latter courses, along with the topics and independent study credits may count under any of the major field categories with the approval of the director of international studies.

Majors are strongly encouraged to study abroad. Study abroad courses and international internship experiences may be counted toward the requirements of the major with the approval of the director of international studies.

International Studies Minor: 18 s.h.
Required courses: INTL 201 and INTL 488.

International Studies Electives: (12 s.h.): Students choose two from the following four areas and take two courses from each area. These courses cannot count toward the student's major.

Comparative Societies
Economic Interdependence
Global Environmental Issues
International Relations

NOTE: Consult the Curriculum sheet or DARS (degree audit) for course listings and distribution requirements.

Students minoring in international studies are strongly encouraged to study abroad and to study a foreign language.

COURSE DESCRIPTIONS

INTL 201: 3 s.h. (G3)
Introduction to International Studies
Study of global cultural diversity, economic interdependence, environmental issues and international relations. Offered in fall, spring.

INTL 488: 3 s.h.
Senior Seminar
Research, discussion and analysis of current global issues. Offered in spring.

INTL 491: 1-6 s.h.
Topics in International Studies
Investigation of topics on economic, environmental or political global systems or in-depth comparative study of international issues, cultures or the arts. Offered annually.

INTL 498: 1-6 s.h.
Independent Study
For further information, see the *Special Academic Opportunities* section.

LATINO STUDIES

Associate Professor Kimberly Mahaffy, director

Latino studies is an 18 credit interdisciplinary minor that consists of courses from a wide variety of academic disciplines including anthropology, economics, education, geography, history, humanities, mathematics, music, philosophy and Spanish as well as an introductory and senior level course in Latino studies. The Latino studies minor will allow students to become conversant with the language, roots, culture, history and socioeconomic perspectives of the rapidly growing Latino population in the United States. Because the program is both multicultural and multidisciplinary, it promotes the holistic liberal arts approach to learning. Courses in the

HIST 380: U.S.-Latin American Relations
SPAN 201: Intermediate Spanish I
SPAN 202: Intermediate Spanish II
SPAN 361: Oral Spanish I
SOCY 216: Human Population

Latino Electives (choose one)

ANTH 221: Peoples and Cultures of Mexico
ANT 263: Indians of Mexico (F&M)
ECON 203: Introduction to World Economics
ECON 226: Area Studies (with approval of LATS)
EDUC 433: Gender and Race Issues in Children's Literature
GEOG 343: Latin America
HI 231: Latin American Civilization – I (F&M)
HI 232: Latin American Civilization – II (F&M)
HIST 283: Colonial Latin America
HI 373: Modern Mexico (F&M)
HUMN 280: Latin American Women Writers
INTL 491: Topics in International Studies (with approval of LATS)
MATH 102: Survey of Mathematical Ideas in Non-European Culture
MUSI 263: Popular Music
PHIL 407: Political and Social Philosophy
PSYC 318: The Psychology of Racism
SPAN 211: Spanish for Business I
SPAN 212: Spanish for Business II
SPAN 301: Commercial Spanish
SPAN 313: Survey of Latin-American Literature
SPAN 362: Oral Spanish II
SPAN 433: Latin American Prose
SPAN 447: History of Spanish-American Civilization*
SPAN 452: Spanish-American Geography*
SPAN 461: History of Hispanic Ao8BGl2:PA

structured according to the traditional liberal arts approach to college education. The second semester of a foreign language is required in the B.A. program. The B.S. degree program is more specifically applications-oriented. With more required courses in mathematical analysis and science, it is somewhat less flexible than the B.A. program. The B.S.Ed. degree program is the degree and certification program for prospective secondary teachers of mathematics. In addition to having mathematics course requirements comparable to those of the two other programs, the B.S. in Education requires appropriate educational methods courses.

Mathematics majors may elect an option in actuarial science, applied mathematics or statistics, designed to prepare students for careers in these allied fields.

For admission as a major in mathematics, a student is expected to have a sound preparation in high school academic mathematics: algebra I and II, plane geometry and precalculus (trigonometry and analytic geometry). Such students normally begin their mathematics sequence with Calculus I. Students who have completed a calculus course in high school are encouraged to take the College Board Advanced Placement Exam and have their score sent to MU for evaluation. University credit for freshman-level mathematics course(s) will be offered to students with scores of 3 or higher. For further information, see *Advanced Placement Examinations* in the *Admissions* section.

In an effort to ensure that each student is properly placed, the department administers mathematics placement tests to all new students during the spring and early summer. For more information, see the *Curriculum* section.

The cooperative education program allows students valuable experience in a full-time or part-time professional position related to their

Actuarial Science Option

MATH 110: 2 s.h.
Trigonometry
For students preparing to take calculus who need additional background in trigonometry. Beginning with angles, numerical trigonometry and triangle-solving, it develops the concepts and analytical skills required in calculus: identities, inverse functions, trigonometric equations, graphs and applications. Prereq: MATH 101 or high school algebra I, II and geometry.

MATH 130: 3 s.h.
Elements of Statistics I (G2)
Derivation of basic formulas; measures of central tendency and variability; probability and normal curve; sampling and hypothesis testing; confidence intervals. No credit toward a math or four-year computer science major nor under block G2 for majors in the School of Science and Mathematics except for nursing majors. Prereq: any 100 level MATH course or MATH placement testing/evaluation before registration.

MATH 151: 4 s.h.
Calculus for the Management, Life and Social Sciences (G2)
Elementary calculus and its applications in business, economics, life and social sciences. Functions, limits and continuity. The derivative; applications in marginal analysis, optimization, differentials and error estimation. Antiderivatives, area under a curve and definite integrals; integration by parts. Exponential and logarithm functions; applications to growth and decay problems. Improper integrals. No credit toward a major or minor in mathematics. Prereq: MATH 101 or equivalent, with a grade of C- or higher or math placement testing/evaluation before registration.

MATH 155/155H: 3 s.h.
Honors Applied Calculus I (G2)
Provides non-science honors students with an introductory survey of calculus as applied to the business, social and life sciences with emphasis on limits and differentiation. Intended for students in the University Honors College. No credit for math requirement for any major in the School of Science and Mathematics. Offered periodically. Prereq: MATH 160 or permission of instructor.

MATH 156/156H: 3 s.h.
Honors Applied Calculus II (G2)

MATH 301/301H

MATH 365: 3 s.h.
Ordinary Differential Equations
First order differential equations, linear first and second order initial-value problems, power series solutions; applications. Also includes at least one of the following topics: special functions of mathematical physics, Laplace transforms, systems of first order equations. Offered in fall, spring. Prereq: MATH 311.

MATH 370: 3 s.h.
Operations Research
Principles of model building; examples from linear optimization, network analysis, dynamic programming, probabilistic decision theory, Markov chains, queuing theory, simulation and inventory models. Applications and theory will be examined. Offered periodically. Prereq: MATH 322 and one of MATH 235, 333 or 335.

MATH 375: 3 s.h.
Numerical Analysis
Numerical methods for solving systems of linear equations, solving nonlinear equations, integration, interpolation, approximation and least squares curve fitting. Error theory. Offered in fall. Prereq: CSCI 161, MATH 311 and 322.

MATH 393: 3 s.h.
Number Theory
The study of the properties of integers with respect to the fundamental operations. Primary emphasis on the logical derivations of these properties. Includes: induction, divisibility, congruences, theorems of Fermat and Euler, continued fractions and quadratic reciprocity. Offered periodically. Prereq: MATH 310.

MATH 395: 3 s.h.
Introductory Combinatorics
Mathematical foundation for the concepts and techniques used in combinatorics. Topics include recurrence relations, finite differences, generating functions, pigeonhole principle, special sequences of integers (such as Fibonacci, Sterling and Bell sequences), principle of inclusion and exclusion and an introduction to the theory of graphs. Applications will be indicated. Offered periodically. Prereq: MATH 322.

MATH 405: 5 s.h.
Teaching of Mathematics in the Secondary School
Place and function of mathematics in secondary education; evaluation and improvement of instruction; current trends in objectives, methods and subject matter of junior and senior high school mathematics. A considerable portion of class time is devoted to teaching mathematics to secondary school students. Must be taken simultaneously with EDSE 321. Offered in fall, spring. Prereq: MATH 333 (or 335/435), 345 and MATH 353 or 355.

MATH 422: 3 s.h.
Linear Algebra II
A continuation of MATH 322. Topics include further theory of linear transformations and their matrix representations: invariant subspaces, equivalent and similar matrices, canonical forms. The vector space L (V, W). Orthogonal transformations and isometries; analysis of Euclidean motions in R^3. Least squares approximation and theory of generalized inverses. Bilinear and quadratic forms and their matrix representations; applications to conic sections in R^2 and quadric surfaces in R^3. Complex vector spaces. Offered periodically. Prereq: MATH 322.

MATH 435: 3 s.h.
Mathematical Statistics II
A continuation of MATH 335. Functions of random variables, sampling distributions, point estimation, interval estimation, hypotheses testing theory and applications. Offered in spring. Prereq: MATH 335.

MATH 445: 3 s.h.
Abstract Algebra II
Continuation of MATH 345. Introduction to field theory, rings of polynomials, introduction to Galois theory. Offered periodically. Prereq: MATH 345.

MATH 457: 3 s.h.
Elementary Differential Geometry
Frenet frames; curvature and torsion of curves in 3-space. Calculus of vector fields; geodesics and curvature of surfaces in 3-space. Surface area and volume. The Euler characteristic of a surface and the Gauss-Bonnet theorem. Rigid motions and isometries. Riemannian metrics, parallelism, non-Euclidean geometries and applications. Offered periodically. Prereq: MATH 310, 311, 322.

MATHTH

MATH 471: 3 s.h.
Mathematical Modeling
Applications of mathematics to real-world problems drawn from industry, research laboratories, the physical sciences and engineering and the scientific literature. May inc65t

METEOROLOGY

See Earth Sciences and Physics

MOLECULAR BIOLOGY

See Biology

MUSIC

School of Humanities and Social Sciences

Professor Houlahan, chairperson
Professor Renfroe
Associate Professors Bradel, Heslink, Tacka, Wiley
Assistant Professors Ardrey, Banks, Corley, Darmiento, Gemmell
Instructors Behrens, Englar, Staherski

The Department of Music offers two degree programs leading to the baccalaureate degree with a major in music.

The bachelor of science in education degree (B.S.Ed.) in music education has been given accreditation by the National Association of Schools of Music and the Pennsylvania Department of Education. Completion of the degree requirements leads to certification by the Commonwealth of Pennsylvania for the recipient to teach all music: kindergarten through high school, vocal and instrumental.

The unique and internationally recognized field experience program sets this curriculum apart. Music education students gain experience in the classroom through observation, team teaching, mini-teaching and, student teaching.

A second degree program in music is in liberal arts (B.A.) in music and (B.A.) with music business and technologies and has been accredited by the National Association of Schools of Music.

The B.A. in music consists of a liberal arts curriculum designed to provide students with a broad coverage of courses in music. The emphasis on music literature develops basic musicianship and the ability to perform the literature, as well as providing a fuller intellectual grasp of the art.

The B.A. with emphasis in music business and technologies trains future professionals for the diverse field of the music business. Housed within an academically rigorous liberal arts college, the program focuses on educating musicians who are creative thinkers, technologically savvy, well spoken and well written and aware of the dialogues central to the music business field.

The department is cognizant of the desires of many students from all segments of the University to participate in music. Accordingly, both beginning and advanced courses are available to students enrolled in any curriculum. The music department also provides the opportunity for student performance and participation in a variety of vocal and instrumental organizations. Some of these organizations are: University Choir, University-Community Orchestra, Symphonic Band and Wind Ensemble, the Marauder Marching Unit, Chorale, Men's Choir, Chamber Choir, as well as, Chamber (String) Ensemble, West African Drum and Dance Ensemble, Jazz Ensemble and various other ensembles. A description of these organizations is included in the student handbook.

MUSI 103: 3 s.h.
The Language of Music I (G1)
A course designed to develop a keen sensitivity to the language of musical sounds through creating, performing, conducting music and listening with sensitive awareness. The use of a broad range of musical materials, active exploration and personal discovery will lead the student to grasp the nature of the interactions and relationships that bring meaning to music. Language of music is structured to provide the student with a means to developing greater awareness and accuracy in musical reading and hearing. Designed for students with little or no academic musical background. Offered in fall, spring.

MUSI 104: 3 s.h.
The Language of Music II (G1)
Provides in-depth coverage of the fundamentals of music. Music materials include Western and non-Western music. This is a performance-based class structured to provide the student with a means to develop greater awareness and accuracy in musical reading, writing and hearing. MUSI 104 fulfills MUSI 103 requirements.

MUSI 108, 109, 208, 209, 308, 309, 408, 409: .5 s.h.
Private Music Instruction
(By selection of the staff). Private lessons in piano organ, voice, instrument or composition through the advanced level. Offered in fall, spring.

MUSI 112: 3 s.h.
Solfege, Harmony and Analysis I

MUSI 134, 135, 234, 235, 334, 335, 434, 435: 1-2 s.h.
Major Performance (Piano)
Includes private study and participation in masterclasses. Music majors and minors only. Offered in fall, spring.

MUSI 136, 137, 236, 237, 336, 337, 436, 437: 1-2 s.h.
Major Performance (Organ)
Includes private study and participation in ensembles. Music majors only. Offered in fall, spring.

MUSI 140: 3 s.h.
The Singing Voice in Musical Theatre (G1)
Trains students in good vocal technique in order to handle the many vocal challenges of musical theatre. Ranging from singing in different musical styles, singing while performing demanding dance routines, dealing with amplification, the switch from spoken to sung characterization, the health care of the voice, development of stamina to perform eight shows a week for a year or more and basic theory in order to read and learn music. Offered in the summer.

MUSI 141: 1 s.h.
Vocal Methods
A basic study of the technique of singing to adequately train the voice for practical and aesthetic reasons. Development of range quality, projection, control and the fundamentals of correct breathing is pursued through the use of suitable solo and choral literature. 2 hrs. lab. Enrollment limited to music education majors or permission. Offered in fall.

MUSI 144, 145, 244, 245, 344, 345, 444, 445: 1-2 s.h.
Major Performance (Voice)
Includes private study and participation in master classes. Music majors and minors only. Offered in fall, spring.

Instrumental Class Instruction
The instruments of the band and orchestra. Emphasis on basic skills for performance through materials and methods suitable for school instruction. 2 hrs. lab. MUSI 151 through 253, below, are offered periodically.

MUSI 151: 1 s.h.
Strings I, Violin, Viola

MUSI 251: 1 s.h.
Strings II, Cello, String bass

MUSI 152: 1 s.h.
Woodwinds I

MUSI 252: 1 s.h.
Woodwinds II

MUSI 156: 1 s.h.
Brass I

MUSI 256: 1 s.h.
Brass II

MUSI 153: 1 s.h.
Percussion I

MUSI 253: 1 s.h.
Percussion II

MUSI 154, 155, 254, 255, 354, 355, 454, 455: 1-2 s.h.
Major Performance (Instrument)
Includes private study and participation in master classes. Music majors and minors only. Offered in fall, spring.

MUSI 162: 2 s.h.
Introduction to Art Music
Entry-level investigation of music history for music majors and music minors. Combining elements of a historical survey approach and class discussion, this course examines the developments in musical style in the context of societal changes, changes in aesthetic theories, the development of instruments, patronage and audience expectation. The music and art of each period will be examined with reference to the circumstances of creation and the settings in which musical works were presented. Offered in fall.

MUSI 171: 1 s.h.
Introduction to Music Education
Introduction to music teaching for prospective music educators, (K-12). Emphasis on peer teaching, rote song, popular song and accompanied song, folk song analysis and collection; creating instructional materials through the use of technology. Students learn basic skills in recorder and guitar. 2 hrs. lab. Prereq: MUSI 112 and MUSI 131. Offered in fall.

MUSI 191: 3 s.h.
Music Business for the Pop Musician

MUSI 204: 3 s.h.
Electronic Music (G1)
Explores electronic music as a major cultural expression in the 20th century through cultural trends, listening, analysis and theoretical study. Creative projects are integral to the course. Offered periodically.

MUSI 212: 3 s.h.
Solfege, Harmony and Analysis II
Provides an in-depth coverage of the structures and aesthetics of common practice harmony. Reviews basic triadic progressions in keyboard style, introduces principles of voice leading, nonchord tones, seventh chords, secondary dominants and modulations using diatonic common chords. Investigates the harmonization of melodies and harmonic progressions through a wide range of activities. Musical materials will include selected multicultural folk music and art music examples. Prereq. MUSI 131. Offered in fall.

MUSI 231: 2 s.h.
Class Piano II
Intermediate course in practical keyboard facility accomplished through technique, sight-reading, improvisation, harmonization, composition and analysis. Primary and secondary harmonies are explored in selected multicultural folk songs, art songs and original piano compositions. MUSI 231 is designed to be taken concurrently with MUSI 212. Prereq: MUSI 112. Note: music students majoring in piano take MUSI 377 instead of this course. Offered in fall.

MUSI 263: 3 s.h.
Popular Music (G1)
Musical derivatives and development of pop, jazz and rock styles. Lecture, live and recorded musical demonstration, discussion and analysis. Offered in fall, spring.

MUSI 265: 3 s.h.
Symphonic Music (G1)
Development of symphonic music from the mid-18th century through the present. Relationships between the symphony and other musical genres. Emphasis on listening and analytical observation. Prereq: MUSI 100 or 162. Offered in fall, spring.

MUSI 267: 3 s.h.
Survey of American Music (G1)
American music from the colonization period to the present. Composers, their works, musical organizations and folk music in relation to historical developments which have shaped America's cultural heritage. Analysis of recorded musical examples is an integral part of this course. Prereq: MUSI 100 or permission. Offered in fall, spring.

MUSI 271: 3 s.h.
Elementary Methods (K-5)
This course is designed to prepare students for teaching general music through the integration of multicultural content and practices related to the learner in an elementary school environment. Emphasis is on leading the young learner to understand musical concepts through a variety of behaviors (singing, moving, creating and listening). Also included are issues related to musical literacy development for young students. The course includes a field experience component (observation and teaching) that is intended to allow participants to apply theoretical principles in a practical setting. Prereq: MUSI 212, 141, 171 or permission. Offered in spring.

MUSI 312: 3 s.h.
Solfege, Harmony and Analysis III
This course provides in-depth coverage of the structures and aesthetics of common practice harmony with particular emphasis on the classical style and Baroque period. Reviews diatonic progressions and chromatic harmony. This course investigates the harmonization of melodies and selected harmonic progressions through a wide range of activities. Musical materials will include selected multicultural folk music and art music examples. Prereq: MUSI 331.

MUSI 315: 1 s.h.
Music Composition
The art of music composition through examination of the creative process, rhythmic manipulation, melodic development, counterpoint and har-

MUSI 368: 3 s.h.
World Music (P)
Introduction to terminology and cultural areas of the world. General introduction to the study of world music, the ethnomusicological approach and classification and symbolism of musical instruments. The process of musical innovation and acculturation in the world and the impact of technology and the communications media on contemporary musical styles of non-European cultures. Topics include the music of South and West Africa,

MUSI 498: 1-3 s.h.
Independent Study
For further information on independent study, see the Special Academic Opportunities section of the University Catalog. Offered fall, spring.

MUSI 587: 3 s.h.
Music in the Kindergarten and Preschool Classroom
Offered periodically in summer.

NANOFABRICATION MANUFACTURING TECHNOLOGY

See Industry & Technology

NANOTECHNOLOGY

See Chemistry & Physics

NUCLEAR MEDICINE TECHNOLOGY

See Biology

NURSING

School of Science and Mathematics

Associate Professor Zimmerman, chairperson
Professor Davis
Associate Professors, Palmer, Castellucci
Instructor Kuhns

The Department of Nursing offers an NLNAC-accredited upper division program in nursing leading to a bachelor of science in nursing (B.S.N.) degree. This program is designed for registered nurses who are graduates of accredited diploma or associate degree nursing programs with a GPA of 2.0. Nursing courses may only be taken after attaining junior level status (60-90) credits. NURS 320,

NURS 498: 1-3 s.h.
Independent Study in Nursing
An individualized experience based on the student's particular interests. Provides an opportunity to demonstrate creativity and initiative to investigate further an area of interest in practice, research or education in nursing. Offered periodically. Prereq: NURS 423, 428.

GRADUATE LEVEL COURSES

Several 500 level nursing courses are open to qualified undergraduates with permission from the instructor. For course descriptions, please refer to the *Graduate Catalog.*

NURS 501: 3 s.h.
Theoretical Foundation of Advanced Practice

NURS 503: 3 s.h.
Issues and Roles in Advanced Nursing Practice

NURS 511: 3 s.h.
Pathophysiology for Advanced Practice

NURS 514: 2 s.h.
Family Health Nursing

NURS 530: 3 s.h.
Vulnerable Populations

NURS 560: 5 s.h.
School Nursing

OCCUPATIONAL SAFETY AND ENVIRONMENTAL HEALTH

See Industry & Technology

OCEAN SCIENCES AND COASTAL STUDIES

See Earth Sciences

OPTOMETRY

See Biology

PHILOSOPHY

School of Humanities and Social Sciences

Professor Smith, chairperson
Associate Professors Allen, Stameshkin
Assistant Professors Miller, Ward

Philosophy courses are open to all students and present an opportunity for students to develop their critical thinking skills on a broad range of issues. Traditional subjects include philosophy of religion, introduction to logic and ethical theories. Nontraditional courses include Thanatopsis: Viewing Death and Philosophy in Film.

A major in philosophy is designed to acquaint students with a wide range of philosophers, philosophic concepts and philosophic problems. Such a major can provide adequate training for those who wish to attend graduate school in philosophy or it can be used as a preprofessional major for students who plan to attend graduate school in law, medicine, theology or other professional schools.

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COURSE DESCRIPTIONS

PHIL 100: 3 s.h.
Introduction to Philosophy (G

PHIL 351: 3 s.h.
Contemporary European Philosophy (G1, W)
A study of the European philosophical traditions of hermeneutics, phenomenology, existentialism and structuralism in their historical context, their relations to contemporary culture, particularly to psychology, literature, theology and political action. Offered infrequently. Prereq: ENGL 110.

PHIL 361: 3 s.h.
Asian Philosophy (G1, W)
A study of significant ideas in the philosophical thought of Asia. Offered infrequently. Prereq: ENGL 110.

PHIL 371: 3 s.h.
Advanced Seminar in Philosophy (G1, W)
Explores the core philosophical issues concerning theories of truth, knowledge and objective values. Emphasizes the development of the skills of critical reading and writing as well as performing philosophical research. May be taken any number of times for credit. Offered periodically. Prereq: ENGL 110 and 3 credits in PHIL at the 200-level or higher (excluding PHIL 211 & 312)

PHIL 373: 3 s.h.
Metaphysics (G1, W)
Description and criticism of various metaphysical theories of reality. Offered infrequently. Prereq: ENGL 110.

PHIL 381: 3 s.h.
Ethical Theories (G1, W)
A study of selected moral issues and a critical analysis of the principal ethical theories. Offered infrequently. Prereq: ENGL 110.

PHIL 382: 3 s.h.
Philosophy of Religion (G1, W)
An examination of the justifiability of religion and of the nature of the religious experience, especially religious language. Offered infrequently. Prereq: ENGL 110.

PHIL 383: 3 s.h.
Philosophy of Art and Aesthetics (G1, W)
The history of the philosophy of art; an analysis of the aesthetic experience, the aesthetic object and the creative act. Emphasis will be placed on an analysis of the concepts employed in the criticism of literature, painting and music. Offered annually. Prereq: ENGL 110.

PHIL 391: 3 s.h.
Gender, Utopia and Human Nature (P)
Utopian thought, from classical philosophy to contemporary science fiction. Shows how different cultures have portrayed gender and gender roles as fixed by human nature or as manifestations of alterable social institutions. Prereq: ENGL 110, junior status and two courses in one area of the social sciences or two courses in philosophy. Offered annually. Prereq: ENGL 110 and junior status.

PHIL 407: 3 s.h.
Political and Social Philosophy (G1, W)
An examination of political and social philosophies with a view to discovering their relation to present political and social realities. Offered infrequently. Prereq: ENGL 110.

PHIL 498: Variable credit
Independent Study
For further information on independent study, see the *Special Academic Opportunities* section

PHYSICS

School of Science and Mathematics
Professor Nolan, chairperson
Professors Dooley, Uy
Assistant Professors Dixon, Dushkina, Gilani, Goksu, Hendrick

The Department of Physics offers nine programs leading to the baccalaureate degree with a major in physics. The course structure recommended by the department is essentially identical during the first two years of all programs so that a revision in a student's plan need not involve any loss of time.

The greatest flexibility is found in the liberal arts (B.A.) program, which invites interdisciplinary studies in areas such as biophysics, geophysics, physical oceanography, chemical physics, mathematical physics or astronomy. The program can also be tailored to prepare a student for immediate employment or for graduate study in various areas such as medicine, law, engineering, business management, scientific journalism, nanotechnology and others for which an undergraduate major in physics is valuable.

The bachelor of science degree in physics involves the greatest depth in physics and mathematics. This program prepares the student for employment in a technical position upon graduation and provides as well a solid foundation for entrance into a graduate program in physics.

The physics-3/2 cooperative engineering option requires three years of study at Millersville in the liberal arts curriculum with a physics major plus two years in residence in the engineering program at one of the cooperating institutions: Pennsylvania State University or the University of Southern California. At the end of the five years, the student receives two baccalaureate degrees: a B.A. in physics from Millersville and a B.S. in engineering from the cooperating engineering school.

In addition to the 3/2 arrangement, we have two other cooperative programs, one of these is a 4/2 program with Penn State. A student studies for four years at Millersville and earns a B.S. degree in physics. After transferring to Penn State, in two years the student earns a master's degree from the Department of Engineering Science and Mechanics. In practice, it is possible to complete

this program in less than two years. Up to six undergraduate credits at the 400 level in physics or mathematics may be transferred as graduate credit towards the master's degree at Penn State. Summer research programs at Penn State are also available and can generate graduate credit in this program. A student can finish the graduate portion of this program in a year and a half.

The other cooperative program we have with Penn State leads to a B.A. degree from Millersville with an option in nanotechnology. The standard courses for our B.A. Physics degree are required. However, the student also spends a semester at the Penn State Nanofabrication Facility and earns 18 credits learning the use of specialized nanotechnology devices and techniques. The semester at Penn State typically occurs during the junior year.

The program in secondary education prepares students for careers in precollege teaching, providing certification in physics.

The cooperative education program in physics is an optional arrangement whereby students combine practical on-the-job experience with their formal classroom instruction. After the freshman year, the co-op program is available to all physics majors in the B.A. and B.S. programs who satisfy the departmental admission requirements. For more information, see *Cooperative Education* in the *Special Academic Opportunities* section.

Outstanding students majoring in physics may pursue departmental honors during their senior year. Participation in the departmental honors program is highly selective and offers students in each of our major programs an opportunity to strengthen their background in physics and to work closely with a faculty mentor on an extended research project. General information on departmental honors is found in the *Special Academic Opportunities* section of this catalog. Specific requirements for honors in each of our major programs are available from the department chairperson.

A minor program is also available for students who do not elect a major in physics. The minor offers students an exposure to physics through the intermediate level of our major program.

The department has prepared a student handbook which provides more detailed information on our programs, faculty and resources. This handbook, as well as additional information on any of the above programs, is available from the physics department.

COURSE REQUIREMENTS

Students majoring in physics are required to attain a grade of C- or higher in MATH 161-211 and PHYS 231-232 before moving on to courses which have these courses as prerequisites.

Physics Major (B.A.): 120 s.h. minimum
33 s.h. in physics: PHYS 198, 231, 232, 233, 266, 311, 321, 334, 335, 351, 492, 498. Required related courses: CHEM 111, 112, FORL 101, 102 or competancy, MATH 161, 211, 311, 365; plus four additional 200, 300 and 400 level courses selected from any department with approval of adviser. Foreign language competency required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

Physics Major (B.S.): 120 s.h. minimum
49 s.h. in physics: PHYS 198, 231, 232, 233, 266, 311, 321, 331, 334, 335, 351, 352, 395, 451, 471, 492, 498; plus 6 credits including one 400 level physics course and either PHYS 312 or 322. Required related courses: CHEM 111, 112, MATH 161, 211, 311, 365; plus an additional 6 credits in mathematics at or above the 200 level.

Physics Major (B.A.): 120 s.h. minimum
Computer Science Option
30 s.h. in physics: PHYS 198, 231, 232, 233, 311, 321, 334, 335, 351, 352, 492, 498. 24 s.h. in computer science: *CSCI 140, 161, 162, 370, 362 and one 4 s.h. CSCI elective. Required related courses: CHEM 111, 112; FORL 101, 102 or competency; MATH 161, 211, 311, 365. Foreign language competency required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

*The CSCI courses satisfy the requirements for a minor in computer science.

Physics Major (B.A.): 120 s.h. minimum
Physics/Meteorology Option
33 s.h. in physics: PHYS 198, 231, 232, 233, 266, 311, 321, 334, 335, 351, 492, 498. Required related courses: CHEM 111, 112; FORL 101, 102 or competency; MATH 161, 211, 311, 365; *ESCI 241, 261, 340, 342, 343, 441, 442. Foreign language competancy required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

*The ESCI courses fulfill the requirements for a minor in meteorology. Substitution of ESCI 343 for ESCI 245 will be accepted by the Earth sciences department. The courses fulfill the minimum course requirements for employment by the National Weather Service.

Physics Major (B.A.): 120 s.h. minimum
Nanotechnology Option
36 s.h. in physics: PHYS 198, 231, 232, 233, 266, 311, 321, 334, 335, 351, 492, 498 plus PHYS 431 or 471. Required related courses: CHEM 111, 112; MATH 161, 211, 311, 365; and FORL 101, 102 or competency; plus 18 s.h. earned at the Penn State Nanofabrication Facility. Foreign language competency required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

Physics Major (B.A.): 120 s.h. minimum
Physics/Philosophy Option

Physics Major (B.A.): 120 s.h. minimum
Polymer Chemistry Option
33 s.h. in physics: PHYS 198, 231, 232, 233, 266, 311, 321, 334, 335, 351, 492, 498. 20 s.h. in chemistry: CHEM 111, 112, 231, 232, 381. Required related courses: FORL 101, 102 or competency; MATH 161, 211, 311, 365. Foreign language competancy required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

Physics Major (B.A.): 120 s.h. minimum
Physics-3/2 Cooperative Engineering Option
33 s.h. in physics at MU: PHYS 198, 231, 232, 233, 266, 311, 321, 334, 335, 351, 492, 498. Required related courses: CHEM 111, 112; MATH 161, 211, 311, 365; ENGL 312. Specific engineering curricula have additional requirements. Students MUST consult their advisers or the physics department coordinator for cooperative engineering.

Physics Major (B.S.Ed.): 125 s.h.
Secondary Education Certification
37-38 s.h. in physics: PHYS 198, 231, 232, 233, 266, 311, 317 or ESCI 241, 321, 334, 335, 351, 352, 492, 498. Required related courses: CHEM 111, 112; MATH 161, 211, 311, 365. Professional education: EDFN 211, 241, 330; EDSE 321, 435, 461. Refer to *Admission to Advanced Professional Studies and Certification* (Education Majors) in this catalog for more information.

Physics Minor
19 s.h. in physics: PHYS 231, 232, 233, 334, 335; Prereq or Coreq: MATH 161, 211, 311.

COURSE

PHYS 266: 3 s.h.
Electronics
The fundamentals of analog devices and their application to electronic circuits. Operational amplifiers, power supplies, semiconductor devices, oscillators and an introduction to integrated circuits. Two 3-hr. labs. Prereq: PHYS 132 or 232. Coreq: MATH 161. Offered in spring.

PHYS 302: 3 s.h.
Physics and the Evolution of Western Civilization (P)
The history of the mechanization of the world picture. A study of physics in the evolution of Western civilization and thought relating the impact of the Newtonian revolution on technology, society and thought. 3 hrs. lec. and discussion. Prereq: A physical science course, ENGL 110 and junior status. Offered periodically.

PHYS 311: 3 s.h.
Mechanics I
Lectures, problems and demonstrations developing the fundamental principles and concepts of classical mechanics, including Newton's laws of motion in 3 dimensions, conservation laws, linear and nonlinear oscillating systems, gravitation and central force problems. 3 hrs. lec. Prereq: PHYS 232. Coreq: MATH 365. Offered in fall.

PHYS 312: 3 s.h.
Mechanics II
A continuation of PHYS 311. Includes classical analysis of rigid body motion, noninertial frames of reference, Lagrangian and Hamiltonian dynamics, systems of coupled oscillators, plus special topics. 3 hrs. lec. Prereq: PHYS 311. Offered in spring.

PHYS 317: 3 s.h.
Introduction to Astronomy and Astrophysics
An overview of astronomy and astrophysics for students majoring in the sciences or mathematics, emphasizing selected areas such as terrestrial astronomy, celestial mechanics, stellar evolution, cosmology and the solar system. 3 hrs. lec. Prereq: A year of college level physics and calculus. Offered in fall of odd years.

PHYS 321: 3 s.h.
Electromagnetic Fields HYS 317: 3 s.h.
MHYS 312: 3 s.h.
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PHYS 312: 3 s.h.
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PHYS 365: 3 s.h.
Digital Electronics
Introduction to digital electronics and microprocessors. Design and analysis of combinatorial and sequential digital circuits, microcomputer interfacing and assembly programming. Two 3 hr. labs. Prereq: CSCI 140 or permission of instructor. Offered infrequently.

PHYS 366: 3 s.h.
Micro-Electronic Circuit Analysis
Continuation of PHYS 266. Analysis and design of microelectronic circuits. Analytical treatment of discrete and integrated analog and digital circuits. 3 hrs. lec. Prereq: PHYS 266, 360 or permission of instructor. Offered infrequently.

PHYS 395: 3 s.h.
Techniques in Mathematical Physics
Treatment of advanced mathematical techniques such as complex analysis, matrices, Fourier series, calculus of variations, special functions and integral transforms applied to selected areas of physics. Prereq: PHYS 233, MATH 365. Offered in spring.

PHYS 431: 3 s.h.
Solid State Physics
Classical and quantum analyses of solid matter. Topics include crystal structure, the reciprocal lattice and x-ray diffraction; mechanical properties-phonons; semiclassical analysis of electrical and magnetic properties of insulators and metals; electron band theory of metals, insulators and semiconductors. 3 hrs. lec. Prereq: PHYS 335. Offered in spring of odd years.

PHYS 435: 3 s.h.
Statistical Mechanics
Lectures, problems and computer simulations developing the fundamental principles of classical and quantum statistical mechanics. Subjects include probability theory, the foundations of ensemble development and their application to classical, Fermi and Bose systems. Of special interest is the phenomenology of phase transitions and the modern development of the renormalization group. Prereq: PHYS 335. Offered in fall of even years.

PHYS 451: 1 s.h.
Advanced Physics Laboratory I
Selected experiments in classical and modern physics with opportunities to apply sophisticated techniques to extended experimental problems. 3 hrs. lab. Prereq: PHYS 352. Offered in fall.

PHYS 452: 1 s.h.
Advanced Physics Laboratory II
Continuation of PHYS 451. 3 hrs. lab. Prereq: PHYS 451. Offered in spring.

PHYS 462: 3 s.h.
Advanced Electronics
Microprocessor applications and interfacing, real-time programming. Topics are selected from computer design, control loops, phase-locked loops and communications. Two 3 hr. labs. Prereq: PHYS 266, 365 or permission of instructor. Offered infrequently.

PHYS 471: 3 s.h.
Quantum Mechanics
An introduction to formal quantum theory in terms of operators on a Hilbert space. Dirac notation is introduced and used in the solution of the eigenvalue problems for the harmonic oscillator and angular momentum by operator techniques. Other topics include the dynamics of a spin-1/2 particle, the addition of angular momentum and perturbation theory. Prereq: PHYS 335 or permission of instructor. Offered in spring of even years.

PHYS 492: 2 s.h.
Physics Research and Seminar
The first semester of an independent research experience supervised by a faculty mentars.

POLITICAL SCIENCE

See Government & Political Affairs

POLYMER CHEMISTRY

See Chemistry and Physics

PRE-ATHLETIC TRAINING

See Biology and Wellness & Sport Sciences

PRE-MEDICINE

See Biology and Chemistry

PRE-OPTOMETRY

See Biology

PRE-PODIATRY

See Biology

PSYCHOLOGY

School of Education
Professor Tuleya-Payne, chairperson
Professor Haferkamp, assistant chairperson
Professors Green, Kelly, Luek, Hill, Smith-Wade-El, Woo
Associate Professors Benns-Suter, Foster-Clark, Garner, Grosh, Szollos, Thyrum
Assistant Professors Baker, Cook, Gallagher, Lopez, Rush, Vrendenburg

The Department of Psychology offers a B.A. degree in psychology, double majors with sociology, philosophy, special education, a departmental honors program and a selection of elective courses for all Millersville University students. Psychology majors, through departmental advisement, usually plan a program that leads to one of three goals: (1) graduate with a bachelor's degree and enter the human service field, (2) graduate with a bachelor's degree and enter the business/industrial field or (3) graduate with a bachelor's degree and enter graduate school for advanced study in psychology or related fields.

A minor in psychology is also available to undergraduate students. It provides a general survey of the field and training in psychological research methods.

The undergraduate psychology courses are open to liberal arts and teacher education students. However, a few laboratory and specialized courses are open only to psychology majors and minors.

The cooperative education program in psychology is an optional arrangement whereby students combine practical on-the-job experience with their formal classroom instruction. The co-op program is available to all psychology majors who satisfy the departmental admissions requirements. For further information, see *Cooperative Education* in the *Special Academic Opportunities* section of this catalog.

DEPARTMENTAL POLICIES

The Admission to the Major Policy and the Retention in the Major Policy apply to all majors enrolled in the Psychology B.A. program.

Admission to the Major Policy
Readmitted students must have a 2.25 or higher GPA at Millersville University since readmission in order to be admitted to the psychology major. Current students at Millersville University will be permitted to declare psychology as a major only if they have a CGPA of 2.25 or higher based on at least 15 credit hours including PSYC 100, and if space is available.

Retention in the Major Policy
At the end of each semester, the psychology department will review the academic performance of its majors. If any student with zero to 29.5 earned credits has a GPA below 2.0 or if any student with 30 to 59.5 earned credits has a GPA below 2.25, he/she will be notified by the department that he/she has been placed on probation in the major status for the semester in which notification is made. The department will specify what the student must achieve that semester to be continued in the major. If the student is not successful in meeting the requirements during the probationary semester, he/she will be removed from the major.

Policy

COURSE DESCRIPTIONS

PSYC 100: 3 s.h.
General Psychology (G3)
An introduction to the study of behavior and mental activity, including such aspects as motivation, emotions, sensation and perception, individual differences, the nervous system, learning and personality with a view of understanding behavior.

PSYC 211: 4 s.h.
Principles of Statistics and Experimental Design I
An introduction to research methods and design and to statistical analysis of psychological data. 3 hrs. lec., 2 hrs. lab. Prereq: PSYC 100.

PSYC 212: 4 s.h.
Principles of Statistics and Experimental Design II
A study of standard experimental designs and statistical procedures widely used in psychological research. 3 hrs. lec., 2 hrs. lab. Prereq: PSYC 211 with a grade of C- or higher.

PSYC 227: 3 s.h.
Development of the Child and Adolescent (G3, W)*
A study of the theory and research pertaining to the growth, development and behavior of children through adolescence. Prereq: ENGL 110 and PSYC 100. No course credit given if credit earned for separate course in child psychology or adolescent psychology. No credit given if credit earned for PSYC 228.

PSYC 228: 3 s.h.
Life Span Human Development (G3, W)*
A focus upon the major stages of human development beginning with infancy and continuing through the developmental changes of childhood, adolescence and adulthood through to old age and death. Cognitive and psychosocial aspects of human development are emphasized. Offered in fall, spring. Prereq: ENGL 110 and PSYC 100. No credit given if credit earned for PSYC 227 or 229.

PSYC 229: 3 s.h.
The Adult Years (G3)*
An examination of the years from young adulthood to retirement. Focuses on intimate relationships, family, parenting and other enduring commitments. Offered in spring. Prereq: PSYC 100. No credit given if credit earned for PSYC 228.

*Psychology majors may count only one of these three courses as a core elective.

PSYC 234: 3 s.h.
Human Relations (G3)
An examination of human interactions, both historically and currently, in diverse structures (e.g., family, social, educational, political, economic, etc.). Course content targets increased awareness and understanding of values, traditions and rites of dominant and minority groups and their effect upon interpersonal and inter-group relations. Offered in fall, spring.

PSYC 256: 3 s.h.
Psychology of Human Adjustment (G3, W)
An examination of factors that shape personal and social behavior with a focus on basic issues, problems and therapies as they relate to personal adjustment. Offered annually. Prereq: ENGL 110 and PSYC 100.

PSYC 300: 3 s.h. minimum
Cooperative Education in Psychology

PSYC 311: 3 s.h.
Psychology of Drug Addiction (G3, W)
An investigation of the problems associated with drug addictions. Evaluations of opiates, stimulants, barbiturates, depressants, hallucinogens, marijuana and alcohol, with consideration of the effects of these drugs on the individual. Offered in fall, spring. Prereq: ENGL 110 and PSYC 100 or SOWK 211.

PSYC 314: 4 s.h.
Cognitive Psychology
A laboratory course designed to examine the nature of human memory, perception and thought and to provide an introduction to the techniques used to study these phenomena. 3 hrs. lec., 2 hrs. lab. Offered in fall, spring. Prereq: PSYC 212 with a grade of C- or higher. No credit given if credit earned in PSYC/CSCI 350.

PSYC 315: 4 s.h.
Sensation and Perception
A laboratory course designed to develop an understanding of the models and theories of the sensory and perceptual systems. 3 hrs. lec., 2 hrs. lab. Offered in fall, spring. Prereq: PSYC 212 with a grade of C- or higher.

PSYC 316: 4 s.h.
Learning and Motivation
A theoretical laboratory course designed to investigate and apply the concepts of learning and motivation to both human and animal behavior. 3 hrs. lec., 2 hrs. lab. Offered annually. Prereq: PSYC 212 with a grade of C- or higher.

PSYC 317: 3 s.h.
Social Psychology
A review of the principles of social psychology derived from experimental study. Offered in spring. Prereq: PSYC 100, PSYC 211 recommended.

PSYC 318/318H: 3 s.h.
The Psychology of Racism (P)
Examination of individual and institutional racism in all its aspects with an emphasis on the various psychological explanatory theories and supporting research as well as the various techniques for alleviating this problem. Additional overview of resultant effects on the victims. Prereq: ENGL 110, PSYC 100 and junior status.

PSYC 319: 3 s.h.
Psychology of African Americans (G3, W)
History of psychology in relation to African Americans and approaches to African-American psychology. Examinations of theories, concepts and issues related to the behavior of African Americans. Offered annually. Prereq: ENGL 110.

PSYC 328: 3 s.h.
Selected Issues in Psychology and Religion: The Western Search for Meaning (P)
An exploration of psychological and religious questions, issues and processes in the search to give meaning to one's personal and shared journey. Prereq: ENGL 110, PSYC 100 and junior status

PSYC 329: 3 s.h.
Industrial/Organizational Psychology (G3, W)
A study of research and applications of psychology to the work setting. Knowledge of the psychological processes of learning, motivation, perception and assessment is used to analyze selection, training, work design and performance. Offered annually. Prereq: ENGL 110 and PSYC 100.

PSYC 335: 3 s.h.
Personality Theory (G3)
An introduction to historic and contemporary theories of the human personality. Offered in fall, spring. Prereq: PSYC 100.

PSYC 337: 3 s.h.
Abnormal Psychology (G3, W)
A comprehensive study of the etiology, characteristics and treatment in the categories of abnormal behavioral manifestation. Offered in fall, spring. Prereq: ENGL 110 and PSYC 100.

PSYC 346: 3 s.h.
Behavior Modification
An examination of theory, research and techniques related to the modification of behavior with special emphasis placed on the application of behavior modification procedures in a variety of settings, e.g., family, school and industry. Offered in fall. Prereq: PSYC 211 or permission of instructor.

PSYC/CSCI 350: 3 s.h.
Cognitive Science (P)
Basic introduction to cognitive science. Reviews attempts to understand cognition using insights from psychology, artificial intelligence, philosophy, linguistics and the neurosciences. Examines the synthesis of those attempts in the emergent field of cognitive science. Offered periodically. Prereq: completion of fundamentals component of general education, ENGL 110 and junior status. No credit given if credit earned in PSYC/CSCI 314.

PSYC 356: 3 s.h.
Health Psychology
A review of research and theory linking psychological factors to health. Discussion of psychosocial aspects of health behavior, pain, stress and the impact on biological systems. Evaluation of psychological and behavior interventions for health behavior change and chronic illness. Offered in fall. Prereq: PSYC 100 and PSYC 227, 228 or 256.

PSYC 400: 3 s.h. minimum
Cooperative Education in Psychology
PSYC 403: 3 s.h.
Family Systems: A Psychological Approach
An investigation of the impact of the multi-generational family system on the individual. Assessment of functional and dysfunctional family systems. Emphasis upon theorists and their orientations and intervention strategies. Offered in spring. Prereq: PSYC 100 and junior or senior standing.

PSYC 415: 3 s.h.
Physiological Psychology
A systematic examination of the nervous and sensory systems and their regulation of human behavior. May not be used in place of PSYC 314, 315 or 316 to fulfill the laboratory requirement. Offered in fall. Prereq: PSYC 100 and one course in biology. Chemistry helpful. Junior or senior standing.

PSYC 417: 3 s.h.
Tests and Measurements
An introduction to the basic principles of psychological testing and measurement. Focus upon issues in test construction and design, evaluations of psychometric properties and applications of tests in various fields of psychology. Offered fall or spring. Prereq: PSYC 211 or permission of instructor.

PSYC 454: 3 s.h.
History and Systems of Psychology
Study of the development of psychology from a branch of philosophy to a modern science. Offered in fall. Prereq: PSYC 100.

PSYC 447: 3 s.h.
Counseling Strategies
An introduction to the process and practice of counseling. Emphasis is placed on learning counseling theories and on counseling skills. Offered in fall, spring. Prereq: PSYC 100.

PSYC 455: 3 s.h.
Senior Seminar in Psychology
An advanced course devoted to critical analysis of student and professional research using staff consultant leadership. Offered periodically. Prereq: Senior psychology majors only.

PSYC 462: 3 s.h.
Psychology and Creativity in Art, Music and the Written Word (P)
Study of psychological processes involved in the production and experience of music, art and literature coupled with a review of psychological

PUBLIC RELATIONS

Affirming the mission of Millersville University, the social work department provides a learning environment designed to prepare social work practitioners as lifelong learners able to live in an increasingly diverse, multicultural and technologically complex society. Building on a liberal arts foundation, we seek to develop educated, ethical productive professional social workers able to meet human needs, enhance human well being and promote social and economic justice through generalist social work practice and social action.

Goal 1: To help students integrate liberal arts and professional knowledge, values and skills into competent being generalist practice.

Goal 2: To sensitize students to issues of human diversity and populations at risk and assist them in pursuing equity in professional and institutional relations.

Goal 3: To prepare students to understand social policy issues and participate in efforts directed toward their resolution.

Goal 4: To prepare students to be ethical practitioners.

Goal 5: To motivate and prepare students for continuing professional development and education.

The curriculum is designed to help students integrate knowledge and theories from many academic disciplines with social work concepts, values and practice skills. Courses in the social work program attempt to develop an understanding of the human condition and human diversity.

The social work major needs to understand biological, psychological and sociocultural aspects of human development; characteristics of human interaction with the social environment; the role, structure and function of social welfare policies and programs; social work intervention methods; and social work research findings and methods.

In addition to theoretical instruction, students are given ample opportunity for practical experience. The experiential requirements begin in the introductory courses and carry through to formal work in advanced courses. The culmination is a year-long practicum experience–30 hours during fall semester and 450 hours during spring semester–wherein the student can integrate knowledge and skills in a social agency or other social service setting in the community.

A formal screening and selection process takes place for each student prior to placement in a social service setting for field instruction. Qualifications are based on academic performance, oral and written communication skills, demonstrated ethical behavior, values

SOWK 302: 3 s.h.
Social Work Practice II
In-depth examination of the knowledge, values and skills that form the base of social work practice; method selection and skill development in social work intervention; practice with social work communication skills. Emphasis on practice with groups and vulnerable populations. Junior field experience required. Offered in spring. Prereq: SOWK 301. SOWK majors only.

SOWK 303: 3 s.h.
Social Welfare and the Law
Significant legislation, court decisions and regulatory language that shape public social policy and affect the legal base for social work practice. Among substantive areas discussed are: family law, mental health law, constitutional and civil rights, poverty law (including landlord-tenant relations), legal regulations of human reproduction and sex behavior, education and professional licensing. Offered in fall. Prereq: SOWK 102 or permission of instructor. SOWK majors only.

SOWK 304: 3 s.h.
Social Work and Corrections
Public policy issues and problems in juvenile and adult corrections. Historical perspective, rehabilitation approaches, de-institutionalization, community-based programs and other trends. The correctional system as a subsystem of the criminal justice system; legal offenders and their families as a vulnerable population group. Roles of the social worker in institutional settings, probation and parole, group homes. Field trips to state prisons, county jails and juvenile facilities. Offered in spring.

SOWK 305: 3 s.h.
Social Work and Child Welfare
Concepts, policies and practices in child welfare services as response to needs of children and their families; focus on services designed to support, supplement or substitute for the care usually given by biological parents; social work practices and public policy issues in foster care, adoption, day care, institutional care, protective services, teenage pregnancy and juvenile delinquency. Offered in spring.

SOWK 306: 3 s.h.
Social Work and Aging
A developmental approach to the aging process as one phase of the life cycle; biological, psychological, social and economic needs of the elderly; analysis of societal provision for these needs; public policy issues and pertinent social legislation; community-based programs of social and health services; techniques of generic social work with older persons; advocacy and policy planning for the aging. Lectures and discussion supplemented with audiovisual material, speakers and field visits as available. Volunteer experience with an older person or persons required. Offered in spring.

SOWK 307: 3 s.h.
Social Work and Health Care
Scope and contribution of professional social work in comprehensive health care settings focusing on individual and community health needs, social and behavioral aspects of illness, essential practice components and skills required of social workers, health care policy, issues and trends, alternative health care programs and research needs. Offered in fall of even years.

SOWK 308: 3 s.h.
Social Work and Alcoholism
Concept, policies, issues, trends, theories and social work practice skills in the setting of alcoholism services. Focuses in interaction of affected individuals with others in family, social, economic, educational, legal and political systems. Examines role of social worker in identification, intervention and use of network of community resources. Offered in spring.

SOWK 309: 3 s.h.
Social Work and Mental Health (W)

SOWK 350: 3 s.h.
Encounters in Human Diversity: Dynamic Problem-Solving in the Context of Diversity (P)
An upper-level, multicultural, interdisciplinary, interactive course designed to enhance students' knowledge, skills and values relative to working with people in professional situations within a diversity-embracing atmosphere. Focus on the various differences in communication styles brought about by gender and culture. Designed for students whose anticipated careers are primarily oriented to direct work with people. Offered in fall of even years. Prereq: COMM 100, ENGL 110 and junior status.

SOWK 401-402: 6 s.h. each
Field Instruction I and II
Supervised placement in social service agencies for 450 hours of social work practice. Malpractice liability insurance required. Offered in spring. Prereq: 24 credit hours of social work professional courses. Prereq: SOWK 403 Coreq: SOWK 404, SOWK majors only.

SOWK 403: 3 s.h.
Social Work Practice III
Theoretical aspects of the skills knowledge and values in social work practice at the macro level involving organizations and communities. Integration of abstract knowledge with concrete experience in the field, including community, agency and "change-effort" papers. 30 hour field experience required. Offered in fall. Prereq: SOWK 302. SOWK majors only.

SOWK 404: 3 s.h.
Senior Seminar
The "capstone" course for social work majors is a bridge between the roles of student and practitioner. The course examines issues and concerns facing social workers entering professional practice, synthesizes and integrates knowledge, value and method components with field experiences. Offered in spring. Prereq: SOWK 403 Coreq: SOWK 401-402. SOWK majors only.

SOWK 405: 3 s.h.
Human Behavior and the Social Environment II
The second of two courses in human behavior and the social environment, emphasizing 1) the interaction of social and economic forces with individuals and social systems; 2) traditional and alternative theories about systems as they interact with people, promoting and impeding health, welfare and well-being, in context of human culture and diversity; and 3) knowledge about opportunity structures and how they promote and deter human development and meeting needs. Offered in fall. Prereq: SOWK 301. SOWK majors only.

SOWK 498: 1-3 s.h.
Independent Study
For further information on independent study, see the *Special Academic Opportunities* section.

SOWK 489, 499:1-3 s.h.
Honors Courses/Thesis
For the definition of honors course/thesis and eligibility, refer to the *Special Academic Opportunities* section of this catalog.

SOCIOLOGY/ANTHROPOLOGY

School of Humanities and Social Sciences

Associate Professor Glazier, chairperson
Professors Arnold, Counihan
Associate Professor Mahaffy, Schmitt
Assistant Professors Porter, Rosenberg, Smith, Trussell

The Department of Sociology/Anthropology offers both a major and minor in sociology, a major and minor in anthropology, an option in archeology and a minor and option in criminology. Many departmental faculty teach in the women's studies, African-American studies and Latino studies programs.

Anthropology Major
The departmental major in anthropology emphasizes a holistic approach to the study of humans, located in all parts of the world through all periods of time. Anthropology consists of four separate but interrelated subdisciplines: cultural anthropology, physical anthropology, archeology and anthropological linguistics. Our program focuses primarily on the subdisciplines of archeology and cultural anthropology. The department encourages its majors to undertake field study in one or more of the subdisciplines of anthropology. A major in anthropology provides the student with a holistic and comparative perspective on problems and situations, which employers find very valuable. An undergraduate degree prepares the student for employment in the area of human services, entry-level work with local or federal government agencies and employment in the business community. Our program also prepares students for more advanced study which leads to careers in teaching and research at colleges, universities or museums or research/consultative careers with local, national or international organizations.

Sociology Major
Sociology is the rigorous, scientific study of human interaction and social organization. The sociologist is primarily interested in discovering the social patterns affecting and resulting from human group behavior. Sociologists focus on the influences of the social as well as the physical and biological environment on individual behavior and personality formation, on group interaction and on social organization and institutions. Within this general framework, sociological interests are extremely varied. The subject matter of sociology includes crime and its causation, family problems and interaction patterns, variations in the aging process, the impact of social class on life chances, the influence of mass media on human behavior, the social construction of gender and the transition from adolescence to adulthood. The sociology major is selected by those students primarily interested in pursuing careers in the following areas: college/university teaching and research, research in a public or private organization or business and employment in community agencies or in local, state or federal government.

Minors and Department Options

The department offers three minors, one in criminology, one in sociology and one in anthropology. These minors provide the student with insight into the principles governing human interaction and social organization. The criminology minor is the most specific of the three, focusing exclusively on the American criminal justice system. The sociology minor, in broad terms, examines American society, while the student minoring in anthropology can focus on either archeology or cultural anthropology. All of these minors should facilitate career advancement and intellectual breadth, regardless of the student's major field of study.

For sociology majors wishing to concentrate their studies in the areas of criminal behavior and criminal justice, the department has a criminology option within the sociology major. This program provides the student not only with a thorough knowledge of the American criminal justice system, but combines that knowledge with a broad understanding of American society and the principles of sociological method and theory.

The archeology option within the anthropology major offers students a broad view of contemporary archeology, with emphasis on contract archeology, artifact analysis, current method and theory, field experience and independent research.

The department strongly encourages all of its majors to acquire practical experience as part of their degree program. This experience may take a variety of forms, depending on the student's major or minor. Along with other activities, the department recommends participating in faculty supervised research (ongoing research projects are conducted out of both the archeology and social research labs), cooperative education/internships (see *Cooperative Education* in the *Special 6he*

SOCY 338: 3 s.h.
Sociology of Deviance
Deviance as a social phenomenon. Discusses how definitions of deviance have changed over time, how people become labeled “deviant,” and the utility of various theories of deviance. Offered annually. Prereq: SOCY 101.

SOCY 339: 3 s.h.
Topics in Criminology (W)
The nature, extent, origins and possible “solutions” to select problems in contemporary criminology. Offered periodically. Prereq: ENGL 110, SOCY 101 and SOCY 230 or permission of instructor.

SOCY 342: 3 s.h.
Japanese Society (P)
An interdisciplinary approach to Japanese culture and society focusing on the arts, humanities and social sciences. Includes traditional culture, social

ANTH 425: 1-6 s.h.
Field/Research Experience in Anthropology
Individual or group research in any of the subdisciplines of anthropology which include the summer archeological field school and ethnographic field projects. Offered periodically. Prereq: permission of instructor.

ANTH 458: 3-6 s.h.
Senior Seminar in Anthropology
Research and group discussions for advanced students on various topics of interest. A total of 6 s.h. may be taken. Offered alternate years. Prereq: permission of instructor.

ANTH 489, 499: 1-4 s.h.
Departmental Honors in Anthropology
Two to four semesters of supervised research by highly motivated students capable of conducting independent research projects. Prerequisite 3.0 GPA and recommendation by faculty mentor. For further information, see the *Special Academic Opportunities* section.

ANTH 498: 1-6 s.h.
Independent Study in Anthropology
For further information, see the *Special Academic Opportunities* section.

ANTH 586: 3-6 s.h.
Topics in Anthropology
Offered periodically.

SPANISH

See Foreign Languages

SPECIAL EDUCATION

School of Education

Associate Professor Rohena, chairperson
Professor Ridley
Associate Professors Edeh-Herr, Neuville, Papalia-Berardi, Rohena
Assistant Professor Long, MehrenburgAssistant. (40cch6114of444j/SpaS)5(t)5MuentC -386Ma(53Me)5(C -125(e)5(n)5(c)5(o)5Mu)5MragedC -

The Department of Special Education also offers 500-level elective courses at the graduate level for its upperclass majors and other interested upper- class students. (See the *Graduate Catalog* for course descriptions.)

COURSE REQUIREMENTS

Special Education Major (B.S.Ed.): 120 s.h.
N-12 Certification in Special Education
Major Sequence Requirements: SPED 101, 102, 212, 325, 326, 327, 328 and two electives: SPED 313, 314, 315, 316, 317, 318. SPED 325 and 328 require advanced professional studies status prior to registration.

Professional Education Core: EDUC 220, EDFN 211, EDFN 241, EDFN 333; Required Related Courses: MATH 104 and 105, PSYC 100 and 227 or 228; EDUC 424 or 425.

Special Education Professional Block: Must be taken after all required courses have been completed with a "C" or higher: SPED 431, 432, 433, 434, 436; Student Teaching, EDSP 461, 462. Admission to advanced professional studies requires student to have earned 60 credits and have overall 3.0 GPA, completed PRAXIS Part 1 (PPST), two English courses, one being a literature, two college math courses, passed a laboratory science course and have completed a background check including satisfactory reports for FBI, Act 34 and Act 151. See specific courses for this requirement. Refer to *Admission to Advanced Professional Studies and Certification* (Education Majors) in this catalog for more information.

COURSE DESCRIPTIONS

SPED 101: 3 s.h.
Orientation to Special Education
Introduction for special education majors, elementary education majors and elementary education/special education majors emphasizing various theoretical aspects in the field. Includes historical and legal considerations, educational and developmental needs of students with exceptionalities, special education programs, services, resources and materials. Emphasis on practical exposure to individuals with disabilities and their learning and behavioral challenges. Offered fall, spring, summer.

SPED 102: 3 s.h.
National, State and Community Resources
Acquaints students with national, state and community organizations and services available for families and individuals with disabilities. May include

SPED 317: 3 s.h.
Expressive Disorders for Students with Disabilities
Develops competencies in identifying and teaching students with disabilities who also have expressive disorders in speech and/or language. The etilogy and identification of expressive disorders will be noted with emphasis on how to reinforce in the classroom setting the recommendations provided by speech clinicians and/or language clinicians. Offered periodically. Prereq: all SPED 100 and 200 level courses or permission of the department chair.

SPED 318: 3 s.h.
Special Education for Infants, Toddlers and Preschoolers with Developmental Disabilities (W)
Examines the implications of federal mandates for providing educational and supportive services for infants/toddlers/preschoolers with disabilities

SPED 436: 3 s.h.
Individual Programming and Instructional Management for Students with Mild and Moderate Disabilities
Develops competencies in developing Individual Education Programs and instructional management. Consists of those strategies which make possible the delivery of curricula in special education settings. Offered in fall, spring. Prereq: SPED 100, 200 and 300 level courses; admission to advanced professional studies.

EDSP 461: 6 s.h.
Student Teaching-Special Education: 1st Half Semester

EDSP 462: 6 s.h.
Student Teaching-Special Education: 2nd Half Semester
Two full-time practicum experiences where students have an opportunity to apply educational strategies and interventions for students with mild, moderate and severe disabilities. (See *Academic Policies; Student Teaching, Application and Eligibility; Student Teaching, Transfer Students*).

SPED 489, 499: 1-4 s.h.
Departmental Honors
For the definition of departmental honors and eligibility, refer to the *Special Academic Opportunities* section of this catalog.

SPED 498: 1-3 s.h.
Independent Study
For further information, see the *Special Academic Opportunities* section.

GRADUATE

SED 498: 1-3 s.h.
Study

those wishing to develop the knowledge and skills necessary to safely coach athletes. Students are eligible to receive certification

COURSE

WOMEN'S STUDIES

Associate Professor Weis, director

Women's Studies is an 18 credit interdisciplinary minor that involves courses in a wide array of traditional fields including history, anthropology, communication, business, health, education and literature. The goal of the minor is to inform students about women's contributions, perspectives and visions in our own and other cultures; to validate women's experiences; and to challenge the economic, political and social devaluation of women. Students electing the minor must take Introduction to Women's Studies (WSTU 220) and Feminist Theory (WSTU 330) as well as WSTU 345 (Feminist Research Methods in WSTU) or WSTU 488 (Senior Seminar) and three other electives from an approved list. The minor complements many majors and can be completed as students fulfill general education requirements. Students taking courses in women's studies will benefit by having a more complete education, a greater appreciation for women's contributions, a greater sense of life options for women and a fuller understanding of gender and its role in human life. Expertise in women's studies will help students successfully handle gender-based power dynamics in all professions as well as prepare them for jobs in women-centered areas of health, social work, education, psychology, journalism, politics, public administration and business.

Women's Studies Minor: 18 s.h.

Required courses: WSTU 220, WSTU 330 and WSTU 345 or 488, plus three courses to be selected from the list of approved courses, at least one of which must be at the 300 level or above. Students will pick courses to satisfy the electives after consultation with their women's studies adviser.

COURSE DESCRIPTIONS

WSTU 220: 3 s.h.
Introduction to Women's Studies (G3)
Interdisciplinary and multi-cultural study of women's roles and relationships and the ways these differ among women by race, ethnicity, class and sexual orientation. Overview of theoretical perspectives on gender and examination of contemporary issues facing women.

WSTU 330: 3 s.h.
Feminist Theory (P)
This course explores diverse strains of feminist theory including liberal, radical, black, global, socialist/Marxist and lesbian feminisms. This is a required course for all women's studies minors. Prereq: ENGL 110, WSTU 220, junior status or instructor permission.

WSTU 345: 3 s.h.
Feminist Research Methods in Women's Studies (G3)
This course introduces qualitative and quantitative research methods relevant to women's studies. This course is one option for fulfilling minor requirements. Prereq: WSTU 220 or instructor permission.

WSTU 488: 3 s.h.
Women's Studies Senior Seminar (G3, W)
Interdisciplinary and mutli-cultural examination of how feminist perspectives and a focus on women can restructure social institutions, ways of thinking and academic disciplines. Prereq: ENGL 110, junior or senior status and WSTU 220 or another approved women's studies course or permission of instructor.

WSTU 491: 1-4 s.h.
Topics in Women's Studies
Investigates topics related to women's studies in history, literature, music, art, anthropology, sociology, communications, business, science or other field.

WSTU 498: 1-6 s.h.
Independent Study
Allows students to pursue an academic area of interest not available through an established course with faculty supervision and guidance. For further information, see the *Special Academic Opportunities* section of the catalog and consult with the director of women's studies.

EDFN 376
Whose School Is It, Anyway? (P)
EDUC 433
Children's Literature: Race, Class and Gender (P)
ENGL 331
American Women Writers
ENGL 337
Women Writers in the Middle Ages (P)
ENGL 416
The Woman Writer and Her World (G1)
ENGL 429
Black Women Writers
ENGL 435

D ec y

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Psychology ..... Helena Tuleya-Payne, D.Ed.
Special Education ..... Elba I. Rohena, Ph.D.
Wellness & Sport Sciences ..... Julie Lombardi, P.E.D.

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Bell, Thomas P. (1995). B.S., Millersville University, 1983; M.Ed., Ibid., 1985; Ph.D., University of Maryland-College Park, 1992. Associate Professor of Industry & Technology;Graduate Coordinator for Technology Education

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Blazer, Eric L. (1996). B.S., Virginia Tech, 1984; M.S., Ibid., 1986; Ph.D., Ibid., 1996. Associate Professor of Business Administration

Blundell, Reuben (2008). B.M., Victorian College of Arts, 2000; M.M., Australian Institute of Music, 2000. Assistant Professor of Music.

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Bonser, Steven M. (2007). B.S. Kutztown University, 1974; M.S. Bucknell University, 1977; Ph.D., University of Minnesota, 1983. Assistant Professor for Chemistry

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Darmiento, Madeleine (1995). B.A., Yale University, 1980eg5V.95; Myj/SpB.A., Yale UniversitynREng0. AtynRCTDervatorytynR(Dale usic.,)1(Y)22(aleD)1(Univ

D usico,

Hepfer, Carol E. (1982). B.A., Wilson College, 1973; Ph.D., Bryn Mawr College, 1979. Professor of Biology

Heslink, Daniel M. (1983). B.Mus., S.U.N.Y. at Fredonia, 1972; M.Mus., Ibid., 1974; D.M., Indiana University, 1987. Associate Professor of

Landis, Jon (2008). B.S., Pennsylvania State University, 1991; M.Ed., Millersville University, 2003. Assistant Professor of Educational Foundations.

LaPorte, James E. (2004). B.S., Montana State University, 1966; M.Ed., Ibid., 1968; Ph.D., Ohio State University, 1980. Assistant Professor of Industry & Technology

Lawrence, Adam B. (2004). B.A., Virginia Polytechnic Institute and State University, 1995; M.A., University of Akron, 1997; Ph.D., University of Pittsburgh, 2004. Assistant Professor of Government & Political Affairs

Lee, Manwoo (1968). B.A., Baldwin-Wallace College, 1960; M.A., Columbia University, 1962; Ph.D., Ibid., 1969. Professor of Government & Political Affairs

Leinberger, Gary

Miller, Jennifer A. (1994). B.S., Portland State University, 1986; Ph.D., University of Oregon, 1994. Assistant Professor of Philosophy

Miller, Steven Max (1985). B.A., College of William and Mary, 1972; M.A., Indiana University (Ind.), 1974; Ph.D., Ibid., 1985. Associate Professor of English

Miller, Timothy C. (1985). B.A., State University of New York at Binghamton, 1976; M.A., Ibid., 1979; Ph.D., Ibid., 1982. Professor of English

Miller, Travis K. (2007). B.S., University of Indianapolis, 1999; M.S., Purdue University, 2002. Ph.D., Ibid., 2007. Assistant Professor of Mathematics

Milovanovic-Barham, Celica (1986). B.A., University of Belgrade, 1968; M.A., Ibid., 1973; Ph.D., Ibid., 1979. Associate Professor of Foreign Languages (Latin and Greek)

Moine, André G. (1996). M.A., New York University, 1984; M.A., University of California-Davis, 1991; Ph.D., Ibid., 1996. Assistant Professor of Foreign Languages (French)

Mollah, Nazli. (2004). B.S., Clarkson University, 1996; M.B.A., Audrey Cohen Business School, 1998; Ph.D., City University of New York, 2004. Assistant Professor of Computer Science

Moné, James P. (1994). B.S., Colorado State University, 1982; M.T. (ASCP), 1982; M.S., Texas Tech University, 1987; Ph.D., Ibid., 1990. Associate Professor of Biology

Mowrey, Rebecca J. (1996). B.A., Mount Union College, 1982; M.S., West Virginia University, 1983; D.P.E., Springfield College, 1989. Professor of Wellness & Sport Sciences

Nakhai, Behnam (1987). B.S., Tehran College of Insurance, 1975; M.B.A., Northrop University, 1976; M.A., Claremont Graduate University, 1978; Ph.D., Ibid., 1982. Professor of Business Administration

Nell, Marcia (2006). B.S., University of Akron, 1979; M.Ed., University of South Florida, 1989. Assistant Professor of Elementary and Early Childhood Education

Nesbitt, Gordon M. (1997). B.S., University of Manitoba, 1983; M.S., University of Illinois, 1985; Ph.D., Purdue University, 1993. Associate Professor of Wellness & Sport Sciences;Director of Campus Recreation and Intramurals

Neuville, Thomas J. (1999). B.S.W., University of Wisconsin, 1974; M.B.A., University of Phoenix, 1987; Ph.D., Colorado State University, 2000. Associate Professor of Special Education

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