Languages and Literatures

Pier Raimondo Baldini
Chair
(LL B404) 602/965–6281

REGENTS' PROFESSORS
D. FOSTER, KELLER

PROFESSORS
ALARCON, ALEXANDER, BALDINI, COUCH, CURRAN, EKMANIS, FLYS, HORWATH, LOSSE, VALDIVIESO, VOLEK, WIXTED

ASSOCIATE PROFESSORS
BALLON-AGUIRRE, CARVER, COTA-CARDENAS, CROFT, GUNTERMANN, W. HENDRICKSON, LAFFORD, RADKE, REIMAN, RODD, SENNER, WETSEL, WILLIAMS

ASSISTANT PROFESSORS
BOYER, BURTON, GALINDO, GARCIA-FERNANDEZ, GRUZINSKA, HERNANDEZ-G., OSSIPOV, SANCHEZ, SUWARNO, TIPTON, VITULLO

INSTRUCTORS
HABERMAN, MORGAN, TU

LECTURERS
FOARD, L. FOSTER, S. HENDRICKSON, SAEGUSA, URIOSTE

PROFESSORS EMERITI
ACEVEDO, CARLSON, GROBE, KNOWLTON, LAETZ, LANDEIRA, LOWE, LUENOW, MARTINEZ, SCHUBACK, SHEPPARD, VIRGILLO, VON DER HEYDT, WILSON, WIRTZ, WOLLAM

BACHELOR OF ARTS DEGREE

The department offers majors in Asian Languages (Chinese/Japanese), French, German, Italian, Russian, and Spanish. Each major consists of 45 semester hours, of which 30 must be in one language and 15 in a second language or in closely related fields to be approved by the advisor in consultation with the student. Of the 30 hours required for the major, a minimum of 24 hours must be taken above the 200 level and must include at least nine hours at the 400 level or above. Specific required courses for each major area are listed in a brochure available in the department. See "Degree Requirements," page 87.

MINORS

Each minor in Asian Languages (Chinese/Japanese), French, German, Italian, Russian, and Spanish consists of 18 hours, of which 12 hours must be upper division. Specific required courses for each area are listed in a brochure in the department.

Asian Studies Emphasis. Foreign language students majoring in Asian languages may elect to pursue an Asian Studies emphasis combining courses from the major with selected outside courses of wholly Asian content. See "Asian Studies," page 90, for more information.

Latin American Studies Emphasis. Foreign language students majoring in Spanish may elect to pursue a Latin American Studies emphasis combining courses from the major with selected outside courses of wholly Latin American content. See "Latin American Studies," page 91, for more information.

Mexican American Studies Emphasis. This emphasis consists of 45 semester hours, of which 30 hours must be in Spanish (to include SPA 421, 464, and 471) and 15 hours in Mexican American content courses as related fields. Fulfillment of requirements is recognized on the transcript as a major in Spanish-Mexican American studies emphasis.

Russian and East European Studies. Any undergraduate major can earn a Certificate in Russian and East European Studies by successfully completing one of the options mentioned in the section on "Russian and East European Studies," page 91.

Southeast Asian Studies Emphasis. To earn a certificate in Southeast Asian Studies, a student must complete a minimum of 40 semester hours of course work related to Southeast Asia, including two years (20 semester hours) of a Southeast Asian language. See "Southeast Asian Studies," page 91, for more information.

SECONDARY EDUCATION— B.A.E.

Chinese, French, German, Japanese, Russian, and Spanish. Each of the major teaching fields consists of 45 semester hours, of which 30 must be in

one language and 15 in a second language or in closely related fields to be approved by the advisor in consultation with the student. Of the 30 hours required for the academic specialization, a minimum of 24 hours must be taken above the 200 level and must include at least nine hours at the 400 level or above. Specific required courses for each major area are listed in curriculum check sheets of the individual language areas available in the department.

The minor teaching field consists of a minimum of 24 semester hours in one foreign language, of which at least 18 hours must be taken above the 200 level. See individual language area curriculum check sheets for required courses in each minor area.

GRADUATE PROGRAMS

The Department of Languages and Literatures offers programs leading to the Master of Arts degree in French, German, and Spanish and the Doctor of Philosophy degree in Spanish. Consult the *Graduate Catalog* for requirements.

FOREIGN LANGUAGES FOR INTERNATIONAL PROFESSIONS

The sequence of two semesters, listed under numbers 107 and 207 in two languages (French and Spanish), integrates an accelerated study, a functional approach to course design, and preparation for international professions (e.g., business, diplomacy, international political economy). It is parallel to the traditional sequence of 101 through 202 and also satisfies the college's foreign language requirement. The sequence differs from traditional basic language programs in that all aspects of the language—vocabulary, grammar, and skill development—are practiced within the context of authentic communication for social and professional purposes in the target culture. Classes meet eight hours weekly, for eight semester hours in each of two semesters.

Those who have had success in learning one foreign language are encouraged to join this program in a second language. Students should contact the Department of Languages and Literatures before registration.

CERTIFICATE PROGRAM IN TRANSLATION

The Certificate Program in Translation is designed to provide the advanced training required for professional translation in both public and private sectors, preparation for the rigorous examinations required by national and international agencies, and training as an ancillary skill for professional fields, such as international business, public health and medicine, and law, in accordance with guidelines recommended by the American Translators' Association. The certificate is a nondegree program consisting of 15 semester hours of course work and two hours of in-service practicum primarily into the receptor language of English from the source languages of French and Spanish. It may be taken simultaneously with course work leading to an undergraduate or graduate degree, as a related area sequence, or as the sole program of study for members of the community who meet the admission requirements of the certificate program but who are not enrolled in a degree program. A complete brochure is available at the Department of Languages and Literatures, LL B404.

Admission Requirements. Since entrance to professional translation is through work, cultural experience, and examination, the two entrance requirements to this certificate program are (1) written proficiency examination in the source and the receptor languages at the level of completion of the fourth year or most advanced composition course in French or Spanish, which at ASU are FRE 412 and SPA 412 and (2) either an academic year at a university in a French-speaking or Spanish-speaking country, an extensive work experience using French or Spanish, or demonstrated bilingual facility, both written and oral, in English and either French or Spanish.

Certificate Requirements. The certificate program consists of 15 semester hours of required courses, including six hours general theory of linguistics and translation as a profession (FLA 400, 401), nine hours of applied translation electives in specialized areas (FLA 481, 482, 483, 485), and two hours of in-service practicum (FLA 484).

FOREIGN LANGUAGE REQUIREMENT AND PLACEMENT

The College of Liberal Arts and Sciences requires knowledge of one foreign language equivalent to the completion of two years' study at the college level. This normally includes a sequence of courses numbered 101 and 102 and 201 and 202 *or* 107 and 207. For important exceptions in French, Greek, and Portuguese, see the statement at the head of respective course descriptions.

Students who transfer from other postsecondary institutions with foreign language credits below the 202 level are placed in a course at the level directly above the work completed.

Students who have completed their secondary education in a school where the language of instruction was not English are considered to have satisfied the foreign language requirement. Certification of this status is made at the time of admission to ASU. Questions should be addressed to the foreign credentials evaluator at the Admissions Office.

The foreign language requirement can be met in languages not taught at ASU either by transferring credit from another institution or by passing a proficiency examination. When possible, the Department of Languages and Literatures recommends to the college an appropriate source for such examinations and proctors them. Grading is done by the institution that provides the examination, and the student pays any costs incurred. The examination can be used only to demonstrate proficiency; it does not produce semester hours of credit.

Ordinarily, no placement or proficiency examination is administered to students who wish to continue studying a foreign language for which high school credits have been earned. Students should be guided by the following principles of equivalency: (1) One unit (one academic year) of high school-level study is considered, for placement purposes only, to equal one semester of study of the same language at the university level. Thus, students with one year of high school study would enroll in the second semester course (102); students with two years of high school study, in the third semester course (201), and so on. (2) Students who feel that their high school language preparation was inadequate may choose to place themselves on a lower level, but not lower than 111 with two or three years of high school study and 201 with four years of high school study.

Students with prior knowledge of a language may have all or part of their requirement waived in any one of the following ways:

1. by satisfactory results in a nonrepeatable college-approved proficiency examination;
2. by achieving a grade of at least "C" in the last course of the required sequence; or
3. by achieving a grade of at least "C" in a course at the next higher level.

Students are expected to follow the progressive sequence of 100, 200, and 300. Once credit is earned in a 300-level class in a language, students may not earn lower-division credit in that language.

First-year foreign language courses taught by the Department of Languages and Literatures are not open to students who have spent one or more years in a country where that language is the predominant language. Individual language areas may have different policies. Students with questions about this policy should check with the appropriate language coordinator in the department.

If college transfers are uncertain about course equivalencies, they should contact the Department of Languages and Literatures.

LANGUAGE LABORATORY REQUIREMENT

All students enrolled in 101, 102, 201, and 202 language courses are expected to spend a minimum of one hour per week in the language laboratory or in other assigned audiolingual tape exercises in addition to the regular class periods.

FOREIGN LANGUAGES

FLA 150 Introduction to East Asian Culture. (3) S
An introduction to the cultures of China, Japan, and Korea. *General studies: HU, G.*

323 Survey of Soviet Literature in Translation. (3) F, S
Knowledge of Russian is not required. Survey of the main literary movements, prominent authors, and the most significant works of prose, poetry, and drama of the Soviet period, 1917 to present. *General studies: HU.*

400 Linguistics. (3) S
Surveys major theories of current linguistic study and explores their application to specific issues of English, the Romance Languages, and language teaching. Open to sophomores and juniors with instructor approval. *General studies: SB.*

401 Translation Theory and Practice. (3) N
Translation theories and professional practices and ethics; bibliography, computer technology, and sample texts for natural and social sciences and humanities. Prerequisite: fourth-year composition or instructor approval in respective language area.

415 Bilingualism and Languages in Contact. (3) F
Analysis of linguistic aspects of bilingualism, e.g., pidgins and creoles, code-switching, and other contact phenomena; simultaneous/sequential bilingual language acquisition. Prerequisite: FLA 400 or equivalent or instructor approval. *General studies: SB.*

420 Foreign Literature in Translation. (3) F, S
Topics may be chosen from the following:
(a) Brazilian
(b) Chinese
(c) French
(d) German
(e) Greek
(f) Italian
(g) Latin
(h) Portuguese
(i) Russian
(j) Soviet
(k) Spanish
(l) Spanish-American
Not for language majors (except in Asian languages and Russian); open to language majors as a related-area course. Graduate students by permission. *General studies: HU, G.*

421 Japanese Literature in Translation. (3) F, S
Readings selected by theme or genre or period from various works of Japanese literature in English translation. May be repeated as topic changes. Graduate students by permission. Prerequisite: a course that satisfies the L1 general studies requirement. *General studies: L2, HU.*

425 Cultural Heritage. (3) F, SS
Aspects of political, intellectual, social, and artistic development of a foreign culture. Not for language majors except as a related-area course. Graduate students by permission.

480 Methods of Teaching Foreign Languages. (3) F
Teaching foreign languages and literatures at secondary and college levels. This course will not meet the Liberal Arts and Sciences general studies requirement for humanities and fine arts. Required for admission to SED 478. Prerequisite: 12 hours of upper-division courses in 1 foreign language.

481 Technical and Scientific Translation. (3) N
Resources, practices, strategies, and lexicon for translation of professional texts in subjects such as engineering, architecture, agriculture, computer technology, electronics, and physical and biological sciences. Prerequisite: FLA 401.

482 Business and Financial Translation. (3) N
Resources, practices, strategies, and lexicon for translation of professional texts in subjects such as economics, finance, insurance, management, marketing, accounting, advertising, and real estate. Prerequisite: FLA 401.

483 Medical and Legal Translation. (3) N
Resources and strategies for translation of professional texts in subjects such as medicine, nursing, public health, criminal justice, and international law. May be repeated for a total of 6 semester hours. Prerequisite: FLA 401.

485 Problems of Literary Translation. (3) N
Theory and practice with emphasis on application through individual translation projects. May be repeated for a total of 6 semester hours. Prerequisite: FLA 401 or instructor approval in the respective language area.

515 Second Language Acquisition. (3) S
Description and analysis of second language acquisition and learning simultaneously or sequentially in natural and artificial settings. Prerequisite: FLA 400 or equivalent or instructor approval.

525 Trends and Issues in Foreign Language Teaching. (3) N
Advanced methods seminar, designed for experienced teachers.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

CHINESE

CHI 101 Elementary Chinese. (5) F
Pronunciation, grammar, elementary conversation, and development of basic reading and writing skills. Standard dialect. 5 class hours.

102 Elementary Chinese. (5) S
See CHI 101. Prerequisite: CHI 101 or equivalent.

107 Chinese for International Professions I. (10) F
Accelerated program alternative to CHI 101, 102 sequence. Functional approach to needs of international professions. 10 class hours.

201 Intermediate Chinese. (5) F
Systematic review of grammar. Development of vocabulary through reading and writing. Drill in aural/oral skills. 5 class hours. Prerequisite: CHI 102 or equivalent. *General studies: G.*

202 Intermediate Chinese. (5) S
See CHI 201. Prerequisite: CHI 102 or equivalent. *General studies: G.*

205 Chinese Calligraphy. (1) F, S
An introduction to styles and techniques of Chinese writing. Knowledge of Chinese or Japanese is not required.

205 Chinese Calligraphy. (1) F, S
An introduction to styles and techniques of Chinese writing. Knowledge of Chinese or Japanese is not required.

207 Chinese for International Professions II. (10) S
Continuation of CHI 107, alternative to CHI 107 sequence. Expansion of communicative proficiency in specific areas of international professions. 10 class hours. Prerequisite: CHI 107 or instructor approval. *General studies: G.*

309 Chinese Conversation. (2) F
Aural/oral drills using contemporary stories, articles, and essays. For students with lower-level proficiency. Prerequisite: CHI 202. *General studies: G.*

310 Chinese Conversation. (2) S
See CHI 309. Prerequisite: CHI 202. *General studies: G.*

311 Chinese Conversation. (2) F
Intensive aural/oral practice toward fluency in Modern Chinese, dealing with contemporary plays and/or radio and movie scripts. Prerequisite: CHI 202. *General studies: G.*

312 Chinese Conversation. (2) S
See CHI 309. Prerequisite: CHI 202. *General studies: G.*

313 Advanced Chinese. (3) F
The modern language in general or specific areas depending on the student's needs or interests. 3 hours lecture, arranged lab. Prerequisite: CHI 202 or equivalent. *General studies: G.*

314 Advanced Chinese. (3) S
Continuation of CHI 313. Prerequisite: CHI 313. *General studies: G.*

321 Chinese Literature. (3) F
Selected representative works of the various genres and periods. Prerequisite: CHI 202 or instructor approval. *General studies: HU.*

322 Chinese Literature. (3) S
See CHI 321. Prerequisite: CHI 202 or instructor approval. *General studies: HU, G.*

413 Introduction to Classical Chinese. (3) F
Reading in various genres of pre-20th century literature (wen-yen), with analysis of the structure of the classical writings. Prerequisite: CHI 202 or equivalent. *General studies: HU.*

414 Introduction to Classical Chinese. (3) S
Continuation of CHI 413. Prerequisite: CHI 413. *General studies: HU.*

500 Bibliography and Research Methods. (3) N
Introduction to research materials on China in Chinese, Japanese, and Western languages. Overview of research methods. Lecture, discussion.

514 Advanced Classical Chinese. (3) N
Close readings in selected premodern texts, with focus on special grammatical features, and increased vocabulary. Lecture, discussion.

520 Teaching of Chinese as a Second Language. (3) N
Theory and practice of teaching Chinese, including presentation, interaction, and evaluation, with consideration given to cultural factors. Lecture, discussion.

535 Advanced Readings. (3) N
Readings in primary and secondary sources in history, art, religious studies, economics, or other fields. Lecture, discussion.

543 Chinese Language and Linguistics. (3) F
Analysis and discussion, within the framework of linguistic theory, of selected problems in Chinese phonetics, morphology, and syntax. Lecture, discussion.

585 Problems of Translation. (3) N
Theories and practice of translation: strategies for handling a variety of Chinese texts. Lecture, discussion.

591 Seminar. (3) N
Topics in literary, linguistic, or cultural studies.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

FRENCH

To satisfy the foreign language requirement, students must take FRE 201 and either 203 or 205.

FRE 101 Elementary French. (4) F, S, SS
Intensive aural/oral drill in class and laboratory; basic grammar supplemented by simple prose readings. 4 hours lecture, 1 hour lab. Not open to students with credit in FRE 111.

102 Elementary French. (4) F, S, SS
See FRE 101. Prerequisite: FRE 101 or equivalent.

107 French for International Professions I. (8) F
Accelerated alternative to FRE 101, 102. Functional approach. Emphasis on speaking, understanding, writing, and reading for communicative competence for international professions.

111 Fundamentals of French. (4) F, S
Primarily for students with two years of high school French who need review to enter second year study. Not open to students with credit in FRE 101 or 102. 4 hours lecture, 1 hour lab.

201 Intermediate Grammar Review. (4) F, S, SS
A thorough review of French grammar, including full attention to literary usage. Prerequisite: FRE 102 or 111 or equivalent. *General studies: G.*

203 French Conversation. (4) F, S, SS
Current usage; recommended to improve speaking and comprehension before traveling in French-speaking countries or advancing to 300-level courses. 1 hour lab required. Prerequisite: FRE 201 or equivalent. *General studies: G.*

205 Intermediate Reading. (4) F, S
Designed to increase vocabulary and to teach recognition of stylistic and grammatical elements. Prerequisite: FRE 201 or equivalent. *General studies: HU, G.*

207 French for International Professions II. (8) S
Continuation of FRE 107, alternative to FRE 201, 203 sequence. Expansion of communicative proficiency in specific areas of international professions. Prerequisite: FRE 107 or instructor approval. *General studies: G.*

311 French Conversation. (3) F, S
Further practice in speaking French, emphasizing current usage and promoting facility in the expression of ideas. Prerequisites: FRE 201 (or 205) and 203 *or* equivalents. *General studies: G.*

312 French Composition. (3) F, S
Further practice in writing French, emphasizing current usage and promoting facility in the expression of ideas. Prerequisite: 8 hours of 200-level French or equivalent. *General studies: G.*

315 French Phonetics. (3) F
Practice and theory of French pronunciation. Emphasis will be on standard French, although an overview of regional varieties will be offered. Lecture and lab. Prerequisite: FRE 311 or equivalent.

319 Business Correspondence and Communication. (3) S
Organization and presentation of clear, effective business communications; vocabulary applicable to modern business usage. Prerequisite: FRE 312 or instructor approval. *General studies: G.*

321 French Literature. (3) F, S
Representative masterpieces and significant movements of French literature of the middle ages through the century. Prerequisites: FRE 203 (or 311) and 205 *or* equivalents. *General studies: L2, HU, H.*

322 French Literature. (3) F, S
Literature of the 19th and 20th centuries. Prerequisites: FRE 203 (or 311) and 205 *or* equivalents. *General studies: L2, HU.*

411 Advanced Spoken French. (3) F, S
Improvement of spoken French. Prerequisites: 9 hours of 300-level French, including FRE 311 or equivalents. *General studies: G.*

412 Advanced Written French. (3) F, S
Improvement of composition skills. Prerequisites: 9 hours of 300-level French, including FRE 312 or equivalents. *General studies: G.*

415 French Civilization I. (3) F
Political, intellectual, social, economic, and artistic development of France from its origins to the end of the 17th century. Prerequisite: 6 hours of upper-division French. *General studies: HU.*

416 French Civilization II. (3) S
Political, intellectual, social, economic, and artistic development of France from the 18th century to present. Prerequisite: 6 hours of upper-division French. *General studies: HU, G.*

441 French Literature of the 17th Century. (3) N
From 1600 to 1660. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General studies: HU.*

442 French Literature of the 17th Century. (3) N
From 1660 to 1700. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General studies: HU, H.*

445 French Literature of the 18th Century. (3) N
Contributions of the philosophers and the development of the novel and drama. Prerequisite: 9 hours of 300-level French, including FRE 321 or instructor approval. *General studies: L2, HU.*

451 French Poetry of the 19th Century. (3) N
From Romanticism to Parnassian poetry to Symbolism. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval.

452 French Novel of the 19th Century. (3) N
From Constant, Hugo, Balzac, Stendhal, and Sand to Flaubert and Zola, with emphasis on major literary movements. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General studies: HU.*

453 Theater of the 19th Century. (3) N
From Romantic drama to the Symbolist Theater. Representative plays of Hugo, Musset, Vigny, Dumas, Becque, Rostand, Feydeau, and Mirbeau. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval.

461 Pre-Atomic Literature. (3) F
Representative authors from Proust and Malraux to Sartre from 1900 to 1945. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General studies: HU.*

462 Post-Atomic Literature. (3) S
Representative authors including Camus, Duras, and Robbe-Grillet from 1945 to present. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General studies: HU.*

471 The Literature of Francophone Africa and the Caribbean. (3) N
Selected prose, poetry, and drama of Black authors from Africa and the Caribbean. Prerequisite: 9 hours of 300-level French, including FRE 322 or instructor approval. *General studies: L2, HU.*

472 Franco-Canadian Civilization. (3) S '96
A study of the civilization of Quebec in particular through its history, language, literature, music, and customs. Prerequisite: 9 hours of 300-level French or instructor approval. Cross-listed as FRE 598.

500 Bibliography and Research Methods. (3) F
Required of all graduate students.

510 Explication de Textes. (3) N
Detailed analysis of literary texts.

515 Intellectual Currents in France, from the Middle Ages to the 18th Century. (3) N
Significant social, aesthetic, philosophic, and scientific ideas as presented by major writers of fiction and nonfiction.

516 Intellectual Currents in France, from the 19th Century to the 20th Century. (3) N
See FRE 515.

521 History of the French Language. (3) N
Principal phonological, morphological, and semantic developments of French from Latin to present, with emphasis on old and middle French. Prerequisite: some familiarity with Latin recommended.

531 Medieval French Literature. (3) F
Readings in the epics, early drama, roman courtois, and other representative literary genres of the Middle Ages.

535 French Literature of the 16th Century. (3) S
Readings in French Renaissance literature with special attention to the humanist movement and to Rabelais, Montaigne, and the Pleiade.

591 Seminar. (3) N
Topics may be selected from the following:
(a)   French Literary Criticism
(b)   Corneille, Molière, and Racine
(c)   Diderot, Voltaire, and Rousseau
(d)   Balzac
(e)   Romanticism
(f)   Proust
(g)   Realism and Naturalism
(h)   French Existentialist Literature
(i)   Advanced Problems in French Literature
(j)   Flaubert
(k)   Stendhal and Zola

Omnibus Courses: See page 44 for omnibus courses that may be offered.

GERMAN

GER 101 Elementary German. (4) F, S, SS
Reading, writing, speaking, and understanding of basic German, with emphasis on pronunciation and grammar. 4 hours lecture, 1 hour lab. Not open to students with credit in GER 111.

102 Elementary German. (4) F, S, SS
See GER 101. Prerequisite: GER 101 or equivalent.

111 Fundamentals of German. (4) F, S
Primarily for students with two years of high school German who need review to enter second year study. 4 hours lecture, 1 hour lab. Not open to students with credit in GER 101 or 102.

201 Intermediate German. (4) F, S, SS
Intensive review of grammar, with emphasis on the development of the skills of speaking, listening comprehension, reading, and writing. 4 hours lecture, 1 hour lab. Prerequisite: GER 102 or 111 or equivalent. *General studies: G.*

202 Intermediate German. (4) F, S, SS
See GER 201. Prerequisite: GER 201 or equivalent. *General studies: G.*

303 Scientific German. (3) N
Acquisition of a specialized vocabulary through the reading of German scientific publications. Prerequisite: GER 202 or equivalent.

304 Scientific German. (3) N
See GER 303. Prerequisite: GER 202 or equivalent.

311 German Conversation. (3) F
Expansion of idiom through oral practice dealing with contemporary articles, essays, and stories. 3 semester hours limit for majors. Prerequisite: GER 202 or equivalent. *General studies: G.*

312 German Conversation. (3) S
See GER 311. Prerequisite: GER 202 or equivalent. *General studies: G.*

313 German Composition. (3) S
Intensive practice in writing, emphasizing style, and grammar. Prerequisite: GER 202 or equivalent. *General studies: G.*

314 Introduction to German Literature. (3) F
Beginning study of German poetry, drama, the novel, and the *Novelle.* Prerequisite: GER 202 or equivalent.

319 Business Correspondence and Communication. (3) N
Organization and presentation of clear, effective business communications; vocabulary applicable to modern business usage. Prerequisite: GER 313 or instructor approval. *General studies: G.*

321 German Literature. (3) F
From the beginning to classicism. Prerequisite: GER 202 or instructor approval. *General studies: HU.*

322 German Literature. (3) S
From Romanticism to the present. Prerequisite: GER 202 or instructor approval. *General studies: L2, HU.*

411 Advanced Grammar and Conversation. (3) F
Improvement of diction and idiom through intensive oral review. Prerequisite: GER 311 or 312 or equivalent. *General studies: G.*

412 Advanced Grammar and Composition. (3) S
Improvement of writing ability. Prerequisite: GER 313 or equivalent. *General studies: G.*

415 German Civilization. (3) S
Aspects of political, social, and cultural life of the German-speaking world from the beginning through 1600. Prerequisite: any 300-level course in German or instructor approval. *General studies: HU, H.*

416 German Civilization. (3) F
From 1600 through 1945. Prerequisite: any 300-level course in German or instructor approval. *General studies: HU, H.*

445 German Literature: Enlightenment to Classicism. (3) N
Major works of the literary epochs in the century. Prerequisite: GER 321 or instructor approval.

451 German Literature: Biedermeier to Naturalism. (3) N
Representative works of prose and poetry from 1820 to 1890. Prerequisite: GER 322 or instructor approval.

461 Contemporary German Literature. (3) S, SS
German writers since 1945. Prerequisite: GER 322 or instructor approval.

500 Bibliography and Research Methods. (3) N
Required of all graduate students.

511 German Stylistics. (3) N
Art of writing literary German, comparative stylistics.

521 History of German Language. (3) N
Linguistic development of German from the earliest records to the present.

523 German Drama. (3) N
Drama of the 19th and 20th centuries.

525 German Novel. (3) N
Special studies in the German novel.

527 The *Novelle.* (3) N
Special studies in the German short story.

531 Middle High German Language and Literature. (3) N
Reading and discussion of specimens of the Middle High German epics, romances, and other literary genres.

551 Romanticism. (3) N
Treatment of early and late Romanticism.

555 Modern German Literature. (3) N
Major works from the period of Expressionism to 1945.

591 Seminar. (3) N
Special topics are concerned with a figure, theme, or work in German literature or Germanic studies. Topics may be selected from the following:
(a) Goethe
(b) Faust
(c) Schiller
(d) Kleist
(e) Kafka
(f) Hesse
(g) Grass and Boll
(h) Germanic Studies

Omnibus Courses: See page 44 for omnibus courses that may be offered.

GREEK

Completion of GRK 101, 201, 301, and 302 satisfies the Liberal Arts and Sciences language requirements.

GRK 101 Elementary Greek. (4) F
For beginning students only.

201 Intermediate Greek. (4) S
Continuation of GRK 101. Prerequisite: GRK 101 or instructor approval.

301 Greek Literature. (3) F,
Readings in the masterpieces of ancient Greek literature; advanced grammar. Authors read are changed each year in accordance with needs of the class. May be repeated for credit. Prerequisite: GRK 201 or instructor approval. *General studies: HU.*

302 Greek Literature. (3) S
See GRK 301. Prerequisite: GRK 201 or instructor approval. *General studies: HU.*

Omnibus Courses: See page 44 for omnibus courses that may be offered.

HEBREW

HEB 101 Elementary Modern Hebrew. (4) F
Reading, writing, speaking, and understanding of basic modern Hebrew, with emphasis on pronunciation and grammar. 4 hours lecture, 1 hour lab.

102 Elementary Modern Hebrew. (4) S
Reading, writing, speaking, and understanding of basic modern Hebrew, with emphasis on pronunciation and grammar. 4 hours lecture, 1 hour lab. Prerequisite: HEB 101 or equivalent.

201 Intermediate Modern Hebrew. (4) F
Intensive review of grammar, with emphasis on the development of the skills of speaking, listening comprehension, reading, and writing. 4 hours lecture, 1 hour lab. Prerequisite: HEB 102 or equivalent.

202 Intermediate Modern Hebrew. (4) S
Intensive review of grammar, with emphasis on the development of the skills of speaking, listening comprehension, reading, and writing. 4 hours lecture, 1 hour lab. Prerequisite: HEB 201 or equivalent.

313 Advanced Modern Hebrew. (4) F
Continued development of ability to communicate orally and in writing. Reading of selected literary works. Prerequisite: HEB 202 or equivalent.

314 Advanced Modern Hebrew. (4) S
Continued development of ability to communicate orally and in writing. Reading of selected literary works. Prerequisite: HEB 313 or equivalent.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

INDONESIAN

IDN 101 Elementary Indonesian I. (5) F
Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose reading. 4 hours lecture, 1 hour lab.

102 Elementary Indonesian II. (5) S
Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose reading. 4 hours lecture, 1 hour lab. Prerequisite: IDN 101 or equivalent.

201 Intermediate Indonesian I. (5) F
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 lectures, 1 hour lab. Prerequisite: IDN 102 or equivalent.

202 Intermediate Indonesian II. (5) S
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 lectures, 1 hour lab. Prerequisite: IDN 201 or equivalent.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

ITALIAN

ITA 101 Elementary Italian. (4) F, S
Aural/oral drill in class and laboratory, and basic grammar supplemented by simple prose readings. 4 hours lecture, 1 hour lab.

102 Elementary Italian. (4) F, S
See ITA 101. Prerequisite: ITA 101 or equivalent.

201 Intermediate Italian. (4) F, S
Intensive review of the fundamentals of Italian grammatical structure to increase the student's ability in composition, translation, and idiomatic expression. 4 hours lecture, 1 hour lab. Prerequisite: ITA 102 or equivalent. *General studies: G.*

202 Intermediate Italian. (4) F, S
See ITA 201. Prerequisite: ITA 201 or equivalent. *General studies: G.*

311 Italian Composition and Conversation. (3) F, S
Development of writing ability and oral expression. Prerequisite: ITA 202 or equivalent. *General studies: G.*

312 Italian Composition and Conversation. (3) F, S
See ITA 311. Prerequisite: ITA 202 or equivalent. *General studies: G.*

314 Advanced Italian. (3) N
An advanced grammar and composition course with readings of selected literary works. Prerequisite: ITA 202 or instructor approval. *General studies: G.*

325 Introduction to Italian Literature. (3) F
Italian literature through the interpretation of representative works in drama, poetry, and novel. Prerequisite: ITA 312 or instructor approval. *General studies: HU.*

415 Italian Civilization. (3) N
A general survey of the history, literature, art, and music, emphasizing Italy's cultural contribution to Western civilization. Prerequisite: 6 hours of upper-division Italian. *General studies: L2, HU, G.*

430 Italian Literature of the Middle Ages. (3) N
Emphasis on "Stil Novo,'' Dante's minor works, Petrarch, and Boccaccio. Prerequisite: ITA 325 or instructor approval. *General studies: HU.*

441 Dante: *Divina Commedia.* (3) N
Critical reading of the three *Cantiche (Inferno, Purgatorio, and Paradiso).* Prerequisite: ITA 325. *General studies: HU.*

443 Italian Literature of the Renaissance. (3) N
Emphasis on Lorenzo de'Medici, Poliziano Castiglione, Machiavelli, Ariosto, and Tasso. Prerequisite: ITA 325 or instructor approval. *General studies: HU.*

446 Italian Literature of the 18th and 19th Century. (3) N
Goldoni, Parini, Alfieri, the poetry of Foscolo and Leopardi, and the socio-historical novels of Foscolo, Manzoni, and Verga. Prerequisite: ITA 325 or instructor approval. *General studies: HU.*

449 20th-Century Italian Literature. (3) N
Major works, figures, and movements of contemporary Italian literature. Prerequisite: ITA 325. *General studies: HU, G.*

Omnibus Courses: See page 44 for omnibus courses that may be offered.

JAPANESE

JPN 101 Elementary Japanese. (5) F
Communication skills, basic grammar, basic reading and basic writing skills, including hiragana, katakana, and about 250 kanji. 5 class hours a week.

102 Elementary Japanese. (5) S
See JPN 101. Prerequisite: JPN 101 or equivalent.

107 Japanese for International Professions I. (10) F
Accelerated program alternative to JPN 101, 102 sequence. Functional approach to needs of international professions. 10 class hours a week.

201 Intermediate Japanese. (5) F
Continued development of communication skills. Increased emphasis on reading and writing. Review of fundamentals of structure to increase student's abilities in composition and translation. 5 class hours a week. Prerequisite: JPN 102 or equivalent. *General studies: G.*

202 Intermediate Japanese. (5) S
See JPN 201. Prerequisite: JPN 102 or equivalent. *General studies: G.*

206 Calligraphy. (1) N
Introduction to the practice of calligraphy in Japan, with emphasis on the derivation of Japanese kana syllabaries from Chinese characters. Prerequisite: CHI 205 or JPN 101.

207 Japanese for International Professions II. (10) S
Continuation of JPN 107, alternative to JPN 201, 202 sequence. Expansion of communicative proficiency in specific areas of international professions. 10 class hours a week. Prerequisite: JPN 107 or instructor approval. *General studies: G.*

309 Intermediate Japanese Conversation. (2) F
Practice in current usage in expression of ideas. Recommended especially for those who have not had the opportunity to practice Japanese in Japan. Prerequisite: JPN 202. *General studies: G.*

310 Intermediate Japanese Conversation. (2) S
Continuation of JPN 309. Prerequisite: JPN 309. *General studies: G.*

311 Japanese Conversation and Composition. (3) F
Intensive aural/oral practice leading toward conversational fluency. Practice in writing Japanese, emphasizing current usage. Prerequisite: JPN 202. *General studies: G.*

312 Japanese Conversation and Composition. (3) S
See JPN 311. Prerequisite: JPN 202. *General studies: G.*

313 Advanced Japanese. (3) F
Continued development of ability to communicate orally and in writing. Exposure to the variety of Japanese written styles. Prerequisite: JPN 202 or equivalent. *General studies: G.*

314 Advanced Japanese. (3) S
See JPN 313. Prerequisite: JPN 313 or instructor approval. *General studies: G.*

321 Japanese Literature. (3) N
Readings in representative masterpieces of modern Japanese literature. Authors read change each year in accordance with the needs of the class. May be repeated for credit. Prerequisite: JPN 313 or instructor approval. *General studies: L2, HU, G.*

414 Introduction to Classical Japanese. (3) S
Readings from various genres of pre-20th-century literature, with analysis of the structure of the classical language. Prerequisite: JPN 313 or instructor approval. *General studies: HU.*

435 Advanced Readings. (3) N
Readings in history, art, religious studies, economics, or other fields. Lecture, discussion. Prerequisite: JPN 314 or equivalent.

485 Problems of Translation. (3) N
Theories and practice of translation: strategies for handling a variety of Japanese texts. Lecture, discussion. Prerequisite: JPN 314 or equivalent.

500 Bibliography and Research Methods. (3) N
Introduction to research materials on Japan both in Japanese and in Western languages. Overview of research methods. Lecture, discussion.

514 Advanced Premodern Japanese. (3) N
Close readings of selected premodern texts, with focus on grammatical and stylistic features. Lecture, discussion. Prerequisite: JPN 414 or equivalent.

520 Teaching of Japanese as a Second Language. (3) N
Theory and practice of teaching Japanese, including presentation, interaction, and evaluation, with consideration given to cultural factors. Lecture, discussion.

535 Advanced Readings. (3) N
Readings in primary and secondary sources in history, art, religious studies, literature, or other fields. Lecture, discussion. Prerequisite: JPN 414 or equivalent.

543 Japanese Language and Linguistics. (3) N
Analysis and discussion of linguistic theories applied to Japanese phonology, morphology, and syntax, including psychological, sociological, and historical aspects. Lecture, discussion.

585 Advanced Problems of Translation. (3) N
Theories and practice of translation; strategies for handling a variety of Japanese texts. Lecture, discussion. Prerequisite: JPN 435 or equivalent.

591 Seminar. (3) N
Topics in literary, linguistic, or cultural studies.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

LATIN

LAT 101 Elementary Latin. (4) F, S
For beginning students only.

102 Elementary Latin. (4) F, S
See LAT 101. Prerequisite: LAT 101 or equivalent.

201 Intermediate Latin. (4) F
Selected Latin literature, both classical and post-classical; Virgil's *Aeneid;* advanced grammar. Prerequisite: LAT 102 or instructor approval. *General studies: HU.*

202 Intermediate Latin. (4) S
See LAT 201. Prerequisite: LAT 102 or instructor approval. *General studies: HU.*

421 Roman Literature. (3) F
Readings in the Latin masterpieces. Authors read change each year in accordance with needs of the class. May be repeated for credit. Prerequisite: LAT 202 or instructor approval.

422 Roman Literature. (3) S
See LAT 421. Prerequisite: LAT 202 or instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

PORTUGUESE

Completion of POR 101, 201, 313, and 314 satisfies the Liberal Arts and Sciences language requirements.

POR 101 Elementary Portuguese. (5) F
Basic grammar with intensive drills in class and laboratory directed toward conversational fluency. 5 hours lecture, 1 hour lab. Prerequisite: 1 year of Spanish or French or Italian or instructor approval.

201 Intermediate Portuguese. (5) S
Continuation of POR 101. Intensive drill of fundamentals in class and laboratory directed toward conversational fluency. 5 hours lecture, 1 hour lab. Prerequisite: POR 101 or instructor approval. *General studies: G.*

313 Portuguese Composition and Conversation. (3) F
Designed to develop skill in written Portuguese and corrected oral expression. Must be taken in sequence. Prerequisite: POR 201 or instructor approval. *General studies: G.*

314 Portuguese Composition and Conversation. (3) S
Continuation of POR 313. Prerequisite: POR 313 or instructor approval. *General studies: G.*

321 Luso-Brazilian Literature. (3) N
Representative masterpieces of Portuguese and Brazilian literature from the beginning to the present. Prerequisite: POR 313 or instructor approval. *General studies: HU.*

472 Luso-Brazilian Civilization. (3) N
Lectures, readings, and discussion of important aspects of Luso-Brazilian civilization. Topics from music, art, folklore, literature, history, and politics. Prerequisite: POR 313 or instructor approval. *General studies: HU, G.*

Omnibus Courses: See page 44 for omnibus courses that may be offered.

RUSSIAN

RUS 101 Elementary Russian. (4) F, S, SS
Structural grammar and basic vocabulary. Introduction and reinforcement of aural/oral reading and writing skills. 4 hours lecture, 1 hour lab.

102 Elementary Russian. (4) S, SS
See RUS 101. Prerequisite: RUS 101 or equivalent.

201 Intermediate Russian. (4) F, SS
Systematic review of grammar. Development of vocabulary through reading and writing. Drill in aural/oral skills. 4 hours lecture, 1 hour lab. Prerequisite: RUS 102 or equivalent. *General studies: G.*

202 Intermediate Russian. (4) S, SS
See RUS 201. Prerequisite: RUS 201 or equivalent. *General studies: G.*

211 Basic Russian Conversation. (3) F
Intensive aural/oral drill to supplement reading and grammatical skills acquired in RUS 101, 102, 201, and 202. Required of Russian majors. Prerequisite: RUS 102. *General studies: G.*

212 Basic Russian Conversation. (3) S
See RUS 211. Prerequisite: RUS 102. *General studies: G.*

303 Scientific Russian. (3) F
Acquisition of scientific vocabulary through reading from current Soviet scientific publications. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. Prerequisite: RUS 102.

304 Scientific Russian. (3) S
See RUS 303. Prerequisite: RUS 102.

311 Russian Composition and Conversation. (3) F
Development of writing ability and oral expression. Prerequisite: RUS 202. *General studies: G.*

312 Russian Composition and Conversation. (3) S
See RUS 311. Prerequisite: RUS 202. *General studies: G.*

321 Survey of Russian Literature. (3) A
The main literary movements, prominent authors, and the most significant works of prose, poetry, and drama to the 1917 revolution. Prerequisite: RUS 202 or equivalent. *General studies: L2, HU, H.*

322 Survey of Russian Literature. (3) A
See RUS 321. Prerequisite: RUS 202 or equivalent. *General studies: L2, HU.*

323 Survey of Soviet Literature. (3) A
The main literary movements, prominent authors, and the most significant works of prose, poetry, and drama of the Soviet period from 1917 to present. Prerequisite: RUS 202 or equivalent. *General studies: L2, HU, G.*

411 Advanced Composition and Conversation I. (3) F
Designed to improve aural discrimination and self-expression in oral and written skills, emphasizing vocabulary building. Subject materials drawn from current Soviet publications. Prerequisite: RUS 312. *General studies: G.*

412 Advanced Composition and Conversation II. (3) S
See RUS 411. Prerequisite: RUS 312. *General studies: G.*

417 Applied Russian Phonetics I. (2) N
General improvement in the student's language skills through aural/oral training in Russian phonology and an analysis of Russian orthography. Prerequisite: RUS 102.

418 Applied Russian Phonetics II. (2) N
See RUS 417. Prerequisite: RUS 102.

420 Russian Poetry. (3) N
Development of Russian poetry from its beginnings to the present, including both native and émigré poets. Topics in criticism and the study of poetics. Prerequisite: RUS 312 or instructor approval. *General studies: L2, HU.*

421 Pushkin. (3) N
Pushkin's poetry, plays, and prose fiction, including *Eugene Onegin, The Little Tragedies, Tales of Belkin, Queen of Spades,* and *The Captain's Daughter.* Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General studies: L2, HU.*

423 Dostoyevsky. (3) N
Dostoyevsky's major works of fiction, including *Crime and Punishment* and *Brothers Karamazov.* Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General studies: L2, HU.*

424 Tolstoy. (3) N
Tolstoy's major works, including *War and Peace* and *Anna Karenina.* Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General studies: L2, HU.*

425 Chekhov. (3) N
Chekhov's major works, representative short stories and major plays, including *The Cherry Orchard* and *Three Sisters.* Taught in English. Does not satisfy the Liberal Arts and Sciences language requirement for B.A. degree. *General studies: L2, HU.*

426 Soviet Dissident Literature (1917–Present). (3) N
Including such authors as Khvylovy, Pasternak, Sinavsky, Daniel, Voinovich, Zinov'ev, Belsevica, Venclova, and others. Prerequisite: RUS 312 or instructor approval. *General studies: L2, HU, G.*

430 Russian Short Story. (3) N
Detailed study of representative works of the Russian short story genre. Authors included are from both Imperial and Soviet Russia. Prerequisite: RUS 312 or instructor approval. *General studies: L2, HU.*

440 History of the Russian Language. (3) N
Principles of historical linguistics presented through the evolution of the Russian language from Proto-Indo-European to the present. Readings of historical documents in Old Russian and Old Church Slavic. Prerequisite: RUS 312 or instructor approval.

441 Survey of Russian Culture. (3) N
Interplay of artistic, social, and political forces in the development of Russian culture from the Kievan period to the present. Exclusive use of Russian language source materials. Prerequisite: RUS 312 or instructor approval. *General studies: HU, G, H.*

591 Seminar. (3) N
Topics may be selected from the following:
(a) Pre-19th Century Russian Literature
(b) 19th-Century Russian Literature
(c) Russian Poetry to 1890
(d) Russian Poetry, 1890 to Present
(e) Russian Literary Criticism
(f) Soviet Socialist Realism
(g) Contemporary Soviet Authors

Omnibus Courses: See page 44 for omnibus courses that may be offered.

SPANISH

Students who have completed their secondary education in a school where Spanish was the official language of instruction should begin their studies at the 325 level or above.

SPA 101 Elementary Spanish. (4) F, S, SS
Fundamentals of the language. Emphasis on listening, speaking, reading, and writing. 4 hours lecture, 1 hour lab. Not open to students with credit in SPA 111.

102 Elementary Spanish. (4) F, S, SS
See SPA 101. Prerequisite: SPA 101 or equivalent. Not open to students with credit in SPA 111.

107 Spanish for International Professions I. (8) F
Accelerated program alternative to SPA 101, 102 sequence. Functional approach to needs of international professions.

111 Fundamentals of Spanish. (4) F, S
Primarily for students with two years of high school Spanish who need review to enter second year study. 4 hours lecture, 1 hour lab. Not open to students with credit in SPA 101 or 102.

201 Intermediate Spanish. (4) F, S, SS
Continuation of fundamentals. Emphasis on the development of the skills of reading, listening comprehension, speaking, writing, and culture. 4 hours lecture, 1 hour lab. Prerequisite: SPA 102 or 111. *General studies: G.*

202 Intermediate Spanish. (4) F, S, SS
See SPA 201. Prerequisite: SPA 201 or equivalent. *General studies: G.*

203 Intermediate Spanish for Bilinguals. (4) F
Designed to meet the needs of the Spanish-speaking student. May be taken in lieu of SPA 201 and 202. Emphasis on composition, literature, conversation, and review of grammar fundamentals. 4 hours lecture, 1 hour lab. Prerequisite: SPA 102 or 111 or placement. *General studies: G.*

204 Intermediate Spanish for Bilinguals. (4) S
See SPA 203. Prerequisite: SPA 203 or equivalent. *General studies: G.*

207 Spanish for International Professions II. (8) S
Continuation of SPA 107, alternative to SPA 201, 202 sequence. Expansion of communicative proficiency in specific areas of international professions. Prerequisite: SPA 107 or instructor approval. *General studies: G.*

311 Spanish Conversation. (3) F, S
Designed primarily for nonmajors to promote vocabulary building and communicative expression in Spanish through discussions based on cultural readings. Prerequisite: SPA 202 or equivalent.

312 Spanish Conversation. (3) F, S
See SPA 311. Prerequisite: SPA 311 or equivalent.

313 Spanish Conversation and Composition. (3) F, S, SS
Designed to develop skill and accuracy in spoken and written Spanish. Required of majors; SPA 313 and 314 must be taken in sequence. Prerequisite: SPA 202 or equivalent. *General studies: G.*

314 Spanish Conversation and Composition. (3) F, S, SS
See SPA 313. Prerequisite: SPA 313 or equivalent. *General studies: G.*

315 Spanish Conversation and Composition for Bilinguals. (3) F
Emphasis on comparing standard Spanish with regional Southwest Spanish. May be taken in lieu of SPA 313 and 314. Prerequisite: SPA 202 or 204 or instructor approval.

316 Spanish Conversation and Composition for Bilinguals. (3) S
See SPA 315. Prerequisite: SPA 315 or equivalent.

319 Business Correspondence and Communication. (3) N
Organization and presentation of clear, effective business communications; vocabulary applicable to modern business usage. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: G.*

325 Introduction to Hispanic Literature. (3) F, S
A critical approach to and analysis of literary types, including poetry, drama, short story, and novel. Required of all majors. Prerequisite: SPA 202 or 204. *General studies: HU.*

412 Advanced Conversation and Composition. (3) F, S
Oral and written Spanish communication skills, with particular attention given to developing fluency and facility. Required of majors. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: G.*

413 Advanced Spanish Grammar. (3) F
Intensive analysis of the Spanish language. Required of teaching majors. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: G.*

417 Spanish Phonetics and Phonology. (3) F
Introduction to the theory and practice of Spanish phonetics and phonology. Prerequisite: SPA 314 or 316.

420 Applied Spanish Linguistics. (3) S
Application of linguistic principles to the acquisition, analysis, and teaching of Spanish. Prerequisite: FLA 400 or any other introductory linguistics course. *General studies: SB.*

421 Spanish in the Southwest. (3) F
Analysis of Southwest spoken and written Spanish as compared to standard Spanish. Designed for students preparing for bilingual-bicultural work. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: SB.*

424 Masterpieces of Hispanic Literature. (3) N
Selections from the literature of the Hispanic world and discussion of its cultural background. Required of but not limited to teaching majors. Prerequisite: SPA 325.

425 Spanish Literature. (3) F, S
Survey of Spanish literature from its beginning to the century. Prerequisite: SPA 325. *General studies: HU.*

426 Spanish Literature. (3) F, S
Survey of Spanish literature from the century to the present. Prerequisite: SPA 325. *General studies: HU.*

427 Spanish-American Literature. (3) F, S
Survey of major works, figures, and movements from Colonial period to 1880. Prerequisite: SPA 325.

428 Spanish-American Literature. (3) F, S
Survey of major works, figures, and movements from 1880 to the present. Prerequisite: SPA 325.

429 Mexican Literature. (3) N
Selected readings from pre-Columbian writers/poets (e.g., Macuilxóchitl) through the novel of the Revolution to the present. Prerequisite: SPA 325.

434 Drama of the Golden Age. (3) S
Dramatic works of Lope de Vega, Calderón de la Barca, and their contemporaries. Prerequisite: SPA 325.

435 Cervantes—*Don Quijote.* (3) F
Don Quijote and the development of the novel. Prerequisite: SPA 325.

454 19th-Century Spanish-American Narrative. (3) F
Principal works in the novel, short story, narrative fiction, and narrative (Gauchesque) poetry. Prerequisite: SPA 325.

456 20th-Century Spanish-American Fiction. (3) S
Major works and movements. Prerequisite: SPA 325.

464 Mexican American Literature. (3) F
Representative literature in Spanish and English by Mexican Americans, emphasizing sociocultural as well as literary values. Prerequisite: SPA 325. *General studies: HU.*

471 Civilization of the Spanish Southwest. (3) S
The political, intellectual, social, economic, and artistic development of the Spanish-speaking people of the Southwest. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: HU.*

472 Spanish-American Civilization. (3) F
Growth of the institutions and cultures of Spanish-American people. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: HU, G, H.*

473 Spanish Civilization. (3) S
Political, intellectual, social, economic, and artistic development of the Spanish nation from its origin to the present. Prerequisite: SPA 314 or 316 or instructor approval. *General studies: HU, SB, G.*

485 Mexican American Short Story. (3) N
Critical study of contemporary short stories by Mexican American authors, with emphasis on their Spanish-language writings. Prerequisite: SPA 325 or instructor approval.

486 Mexican American Novel. (3) N
Social and literary contexts of representative novelists, emphasizing their Spanish-language writings. Prerequisite: SPA 325 or instructor approval.

487 Mexican American Drama. (3) N
Representative dramatic works, with emphasis on the history and development of this genre from its regional origins to the present. Prerequisite: SPA 325 or instructor approval.

500 Bibliography and Research Methods. (3) F
Required of all graduate students.

536 Generation of 1898. (3) N
Works of Unamuno, Baroja, Azorín, and their contemporaries, studied against the ideological background of the turn of century in Spain. Prerequisite: SPA 325.

540 History of the Spanish Language. (3) S
Linguistic development of the Spanish language from the epoch of Vulgar Latin to the present day.

541 Spanish Language in America. (3) F
The major dialects of Spanish in the Americas, and their historical, social, and cultural development. Prerequisite: SPA 540 or instructor approval.

542 Studies in the Spanish of the Southwest. (3) S
Examination of bilingualism and the social and regional dialects of Spanish in the Southwest. Prerequisite: FLA 400 or equivalent.

543 Structure of Spanish. (3) S
Analysis and discussion, within the framework of contemporary linguistic theories, of selected problems in Spanish morphology, syntax, and semantics. Prerequisite: FLA 400 or equivalent.

545 Concepts of Literary Criticism. (3) S
Aims and methods of modern literary scholarship. Discussion of major theories of literary analysis.

555 Spanish-American Modernism. (3) N
Principal works and figures of literary Modernism, 1880–1920, with emphasis on international literary context of the movement. Prerequisite: SPA 325.

557 Contemporary Spanish-American Poetry. (3) N
Major works and problems in contemporary poetry and poetics, with emphasis on Paz, Parra, Cardenal, and new poetry since 1960. Prerequisite: SPA 325.

560 Medieval Spanish Literature. (3) N
Major figures and works of the Middle Ages in Spain.

561 Golden Age Spanish Prose Fiction. (3) N
Major figures and works of the 16th and 17th centuries, with emphasis on the picaresque novel.

562 Golden Age Spanish Poetry. (3) N
Major figures and works of the 16th and 17th centuries, with emphasis on lyric poetry.

563 Spanish Romanticism. (3) N
Principal figures and works of the Spanish Romanticism, with emphasis on international literary context of the movement.

564 19th-Century Spanish Prose Fiction. (3) N
Principal figures and works of Realism in the 19th-century novel, with emphasis on Galdós.

565 20th-Century Spanish Drama. (3) N
Principal figures and works of Spanish dramatic literature from the Generation of 1898 to the present.

566 Generation of 1927. (3) N
Major poets of the Generation of 1927, with emphasis on works of Lorca, Guillén, Salinas, and Aleixandre.

567 Contemporary Spanish Novel. (3) N
Major works of post-Civil War Spanish fiction.

570 Indigenous Literatures of Spanish America. (3) N
The indigenous literary traditions, with emphasis on Nahuatl, Mayan, and Quechua literatures through readings in Spanish translations.

571 Colonial Spanish-American Literature. (3) N
The major figures and works from Conquest to Independence.

572 Spanish-American Drama. (3) N
Major contributions of Spanish-American drama, with emphasis on contemporary dramatists.

573 Spanish-American Essay. (3) N
Major works of the essay, within the framework of intellectual history and literary movements.

574 Spanish-American Vanguard Poetry. (3) N
Examination of poetic developments, 1920–1940, with emphasis on Huidobro, Vallejo, Neruda, and the international context of their works.

575 Contemporary Spanish-American Novel. (3) N
Principal novels of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative.

576 Contemporary Spanish-American Short Story. (3) N
Principal short stories of the *Nueva Narrativa Hispanoamericana*, within the context of contemporary theories of the narrative.

577 Regional Spanish-American Literature. (3) N
The figures and works of major national (Peru, Argentina, Chile, and Mexico) and regional (Caribbean) literatures. Topics offered on a rotating basis. May be repeated for different topics.

578 Novel of the Mexican Revolution. (3) N
Representative works and authors of this genre (Guzmán, Azuela, Urquizo, Muñoz, and Romero), including related or peripheral offshoots in indigenous novels.

581 Latin American Popular Culture. (3) N
Studies in selected topics of Latin American popular culture, with emphasis on appropriate academic models for the critical analysis of these materials.

582 Studies in Latin American Film. (3) N
Examination of the role of film in contemporary Latin American culture; films viewed and analyzed as casebook examples. Seminar.

591 Seminar. (3) N
Spanish and Spanish-American literary, cultural, and linguistic topics.

691 Figures and Works Seminar. (3) N
Topics may be selected from Spanish and Spanish American literatures.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

THAI

THA 101 Elementary Thai I. (5) F
Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose readings in Thai script. 4 hours lecture, 1 hour lab.

102 Elementary Thai II. (5) S
Basic communication, reading, and writing skills. Intensive oral/aural classroom drill supplemented by prose reading. 4 hours lecture, 1 hour lab. Prerequisite: THA 101 or equivalent.

201 Intermediate Thai I. (5) F
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: THA 102 or equivalent.

202 Intermediate Thai II. (5) F
Systematic review of grammar. Continued development of communication skills with increased emphasis on reading and writing. 4 hours lecture, 1 hour lab. Prerequisite: THA 201 or equivalent.

Omnibus Courses: See page 44 for omnibus courses that may be offered. Check with the program office for a current listing.

Mathematics

Christian Ringhofer
Chair
(PS A216) 602/965–3951

PROFESSORS
ARMBRUSTER, BREMNER, BUSTOZ, FELDSTEIN, GOLDSTEIN, GRACE, HELTON, IHRIG, JACKIEWICZ, JACOBOWITZ, KADELL, KIERSTEAD, KUIPER, LEONARD, McDONALD, MITTELMANN, NICOLAENKO, RINGHOFER, H.A. SMITH, H.L. SMITH, THIEME, TROTTER, A. WANG, C. WANG, WEISS, YOUNG

ASSOCIATE PROFESSORS
DRISCOLL, FARMER, HASSETT, KAWSKI, KOSTELICH, KUANG, KURTZ, MOORE, QUIGG, RENAUT, STEWART, SWIMMER, TANG, TAYLOR

ASSISTANT PROFESSORS
BAER, BARCELO, BLOUNT, CHILDRESS, EDEN, FAN, HURLBERT, JONES, LOHR, MAHALOV, McCARTER, PETRIE, PREWITT, SPIELBERG, WELFERT

PROFESSORS EMERITI
BEDIENT, FREUND, KELLY, LAKE, LISKOVEC, NERING, NIEMEIR, SANSONE, SAVAGE, SHERMAN, SINKOV, L. SMITH

MATHEMATICS—B.A.

Mathematics. The program consists of a minimum of 36 semester hours in mathematics and additional course work in closely related fields, as approved by the advisor, for a total of at least 51 semester hours. The required courses must include CSE 100 or 183; MAT 270, 271, 272, 274, 300, 342, 370 (or 371); four 400-level MAT or STP courses approved by the advisor. The department recommends a one-year sequence in some closely related field. Students who plan to attend graduate school in mathematics should choose the Bachelor of Science degree.

MATHEMATICS—B.S.

The program consists of a minimum of 42 semester hours in mathematics plus additional course work in closely related fields, as approved by the advisor, for a total of at least 55 semester hours. The required hours must include

CSE 100 or 183; MAT 270, 271, 272, 342. To satisfy the remaining required hours the student selects either the applied mathematics, computational mathematics, general mathematics, or statistics and probability option.

General Mathematics Option. For this option, the student must take MAT 274, 300, 371, 372, 410 (or 415 or 443 or 445), 461 (or 462 or 475), 464; STP 421; three more hours in a MAT course to be approved by the advisor. The department recommends a one-year sequence in some closely related field.

Pure Mathematics Option. For this option, the student must take CSE 100; MAT 274, 300, 372, 442, 444, 472; two courses from MAT 410, 415, 445, or 461 or STP 421; and two more MAT or STP courses at the 400 level.

Applied Mathematics Option. For this option, the student must take MAT 274, 371, 372, 419, 451, 461, 462, and 464. PHY 121 and 131 also are required and the corresponding laboratory courses (PHY 122 and 132) are strongly recommended. Students should choose additional courses from CSE 101; IEE 476; MAT 415, 416, 419, 443, 463, 465, 472, 475; STP 421, 425, 427.

Computational Mathematics Option. For this option, the student must take CSE 100, 101 (or 200), 225, 226 (or 310); MAT 243 (or 300), 274, 371, 464, 465, 467; STP 326 (or 420 or 421). The remaining hours are to include three upper-division courses, at least two of which must be mathematics, including one at the 400 level, and all of which must be approved by the advisor.

Statistics and Probability Option. For this option, the student must take MAT 300, 371 (or 472), 372; STP 420, 421, 427 (or 425). The remaining courses in mathematics and statistics, as approved by the advisor, may be selected from IEE 476; MAT 415, 419, 442, 464, 465, 466; STP 425, 427, 429. A coherent set of courses in a related field is also required.

MINOR IN MATHEMATICS

The minor in Mathematics consists of a minimum of 24 semester hours. Required courses are MAT 270, 271, 272, and 342. Electives are chosen in consultation with a mathematics advisor and must include three upper-division courses in mathematics and statistics. In addition, CSE 100 and 101 are recommended. An approved Minor Verification Form must be submitted to the Graduation Office of the College of Liberal Arts and Sciences.

SECONDARY EDUCATION— B.A.E.

Mathematics. Students pursuing the major teaching field may choose from two options.

Option One. With this option, the academic specialization consists of at least 36 semester hours in mathematics. Required courses are CSE 100 or 181; MAT 270, 271, 272, 300 (or 243), 310, 342, 371, 443 (or 445); MTE 483; STP 420. MTE 482 is required as part of the 31-hour professional education requirement but cannot be counted as part of the 36-hour major requirement.

Option Two. This option may be exercised only in combination with option two in chemistry (page 101) or physics (page 142). The mathematics portion of this 60-hour program consists of 30 semester hours in mathematics. Required courses are MAT 270, 271, 272, 300, 310, 342, 274 (or 371 or 460), and 443. A computer science course (CSE 100 or 183) is recommended.

Mathematics. The minor teaching field consists of at least 24 semester hours. Required courses are as follows: MAT 270, 271, 272, 300, 310, 342, 274 (or 371 or 460).

GRADUATE PROGRAMS

The Department of Mathematics offers programs leading to the M.A. and Ph.D. degrees. Consult the *Graduate Catalog* for requirements.

MATHEMATICS

MAT 106 Intermediate Algebra. (3) F, S, SS
Topics from basic algebra such as linear equations, polynomials, factoring, exponents, roots, and radicals. Prerequisite: 1 year of high school algebra.

114 College Mathematics. (3) F, S, SS
Applications of basic college-level mathematics to real-life problems. Appropriate for students whose major does not require MAT 117 or 170. Prerequisite: MAT 106 or 2 years of high school algebra. *General studies: N1.*

117 College Algebra. (3) F, S, SS
Linear and quadratic functions, systems of linear equations, logarithmic and exponential functions, sequences, series, and combinatorics. Prerequisite: MAT 106 or 2 years of high school algebra. *General studies: N1.*

119 Finite Mathematics. (3) F, S, SS
Topics from linear algebra, linear programming, combinatorics, probability, and mathematics of finance. Prerequisite: MAT 117 or equivalent. *General studies: N1.*

170 Precalculus. (3) F, S, SS
Intensive preparation for calculus (MAT 260, 270 and 290). Topics include functions (including trigonometric), matrices, polar coordinates, vectors, complex numbers, and mathematical induction. Prerequisite: a grade of "B" in MAT 106 or "C" in MAT 117 or two years of high school algebra. *General studies: N1.*

210 Brief Calculus. (3) F, S, SS
Differential and integral calculus of elementary functions with applications. Not open to students with credit in MAT 260, 270, or 290. Prerequisite: MAT 117 or equivalent. *General studies: N1.*

242 Elementary Linear Algebra. (2) F, S, SS
Introduction to matrices, systems of linear equations, determinants, vector spaces, linear transformations, and eigenvalues. Emphasizes development of computational skills. Prerequisite: 1 semester of calculus or instructor approval. *General studies: N1.*

243 Discrete Mathematical Structures. (3) F, S, SS
Introduction to lattices, graphs, Boolean algebra, and groups, with emphasis on topics relevant to computer science. Prerequisite: 1 semester of calculus.

260 Technical Calculus I. (3) F, S, SS
Analytic geometry, differential, and integral calculus of elementary functions, emphasizing physical interpretation and problem solving. Not open to students with credit in MAT 210, 270, or 290. Prerequisite: MAT 170 or equivalent. *General studies: N1.*

261 Technical Calculus II. (3) F, S, SS
Continuation of MAT 260. Prerequisite: MAT 260 or instructor approval.

262 Technical Calculus III. (3) F, S
Infinite series, an introduction to differential equations and elementary linear algebra. Prerequisite: MAT 261 or equivalent.

270 Calculus with Analytic Geometry I. (4) F, S, SS
Real numbers, limits and continuity, and differential and integral calculus of functions of one variable. Not open to students with credit in MAT 290. The sequence MAT 270, 271 may be substituted for MAT 290 to satisfy requirements of any curriculum. Prerequisites: MAT 170 or equivalent. *General studies: N1.*

271 Calculus with Analytic Geometry II. (4) F, S, SS
Methods of integration, applications of calculus, elements of analytic geometry, improper integrals, sequences, and series. Not open to students with credit in MAT 291. The sequence MAT 270 and 271 and 272 may be substituted to satisfy requirements for MAT 290 and 291. Prerequisite: MAT 270 or equivalent.

272 Calculus with Analytic Geometry III. (4) F, S, SS
Vector-valued functions of several variables, multiple integration, and introduction to vector analysis. The sequence MAT 270 and 271 and 272 may be substituted to satisfy requirements for MAT 290 and 291. Prerequisite: MAT 271 or equivalent.

274 Elementary Differential Equations. (3) F, S, SS
Introduction to ordinary differential equations, adapted to the needs of students in engineering and the sciences. MAT 272 or equivalent is recommended. Prerequisite: MAT 271 or equivalent.

290 Calculus I. (5) F, S
Differential and integral calculus of elementary functions; topics from analytic geometry essential to the study of calculus. Prerequisite: MAT 170 or equivalent. *General studies: N1.*

291 Calculus II. (5) F, S
Further applications of calculus, partial differentiation, multiple integrals, and infinite series. Prerequisite: MAT 290 or equivalent.

300 Mathematical Structures. (3) F, S
Introduction to rigor and proof in mathematics. Basic logic, set theory, mathematical induction, combinatorics, functions, relations, and probability. Prerequisite: 1 semester of calculus or instructor approval. *General studies: L2.*

310 Introduction to Geometry. (3) S
Congruence, area, parallelism, similarity and volume, and Euclidean and non-Euclidean geometry. Prerequisite: MAT 272 or equivalent.

342 Linear Algebra. (3) F, S, SS
Linear equations, matrices, determinants, vector spaces, bases, linear transformations and similarity, inner product spaces, eigenvectors, orthonormal bases, diagonalization, and principal axes. Pre- or corequisite: MAT 272 or equivalent.

362 Advanced Mathematics for Engineers and Scientists I. (3) F, S, SS
Vector analysis, Fourier analysis, and partial differential equations. Prerequisites: MAT 272 and 274 *or* equivalent.

370 Intermediate Calculus. (3) F, S
Theory behind basic one-variable calculus: continuity, derivative, Riemann integral, sequences, and series. Not open to students with credit in MAT 371. Prerequisites: MAT 272 and MAT 300.

371 Advanced Calculus I. (3) F, S
Continuity, Taylor's theorem, partial differentiation, implicit function theorem, vectors, linear transformations and norms in R^n, multiple integrals, and power series. MAT 300 is recommended. Prerequisite: MAT 272 or equivalent. Pre- or corequisite: MAT 342.

372 Advanced Calculus II. (3) F, S
Maps from R^n to R^m, line and surface integrals, divergence and Stokes' theorems, R^m–topology, series, uniform covergence, and improper integrals. Not open to students with credit in MAT 460. Prerequisite: MAT 371.

400 Computability and Unsolvability. (3) N
Turing machines and computability, computable and partial computable functions, recursive sets and predicates, recursively enumerable sets, and unsolvable decision problems and applications. Prerequisite: MAT 243.

401 Theory of Formal Languages. (3) A
Theory of grammar, methods of syntactic analysis and specification, types of artificial languages, relationship between formal languages, and automata. Cross-listed as CSE 457. Prerequisite: CSE 355.

410 Introduction to General Topology. (3) A
Topological spaces, metric spaces, compactness, connectedness, and product spaces. Prerequisite: MAT 300 or 371 or instructor approval.

415 Combinatorial Mathematics I. (3) F
Permutations and combinations, recurrence relations, generating functions, graph theory, and combinatorial proof techniques. Prerequisites: MAT 300 and 342 *or* instructor approval.

416 Combinatorial Mathematics II. (3) S
Continuation of MAT 415 considering some advanced aspects of the theory as well as applications. Topics chosen from transport networks, matching theory, block designs, coding theory, Polya's counting theory, and applications to the physical and life sciences. MAT 443 is recommended. Prerequisite: MAT 415 or instructor approval.

419 Linear Programming. (3) S
Linear programming and the simplex algorithm, network problems, quadratic, and nonlinear programming. Prerequisites: MAT 242 or 342; 1 semester of college calculus. *General studies: N2.*

431 Foundations of Mathematics. (3) N
Topics from mathematical logic and set theory. May be repeated for credit with instructor approval. Prerequisites: MAT 300 and 342 *or* instructor approval.

442 Advanced Linear Algebra. (3) F
Fundamentals of linear algebra, dual spaces, invariant subspaces, canonical forms, bilinear and quadratic forms, and multilinear algebra. Prerequisites: MAT 300 and 342 *or* instructor approval.

443 Introduction to Abstract Algebra. (3) S
Introduction to concepts of abstract algebra. Not open to students with credit in MAT 444. Prerequisites: MAT 300 and 342 *or* instructor approval.

444 Intermediate Abstract Algebra. (3) S
Basic theory of groups, rings, and fields, including an introduction to Galois theory. Appropriate as preparation for MAT 543. Prerequisites: MAT 300 and 342.

445 Theory of Numbers. (3) F
Prime numbers, unique factorization theorem, congruences, Diophantine equations, primitive

roots, and quadratic reciprocity theorem. Prerequisites: MAT 300 and 342 *or* instructor approval.

451 Mathematical Modeling. (3) S
A detailed study of one or more mathematical models which occur in the physical or biological sciences. May be repeated for credit with instructor approval. Prerequisites: MAT 242 (or 342) and 274 *or* instructor approval. *General studies: N2.*

460 Applied Real Analysis. (3) S
Vectors, curvilinear coordinates, Jacobians, implicit function theorem, line and surface integrals, Green's, Stokes', and divergence theorems. Not open to students with credit in MAT 372. Prerequisites: MAT 242 (or 342), 272, 274.

461 Applied Complex Analysis. (3) F, SS
Analytic functions, complex integration, Taylor and Laurent series, residue theorem, conformal mapping, and harmonic functions. Prerequisite: MAT 272 or equivalent.

462 Partial Differential Equations. (3) F, S, SS
Second order partial differential equations, emphasizing Laplace, wave, and diffusion equations. Solutions by the methods of characteristics, separation of variables, and integral transforms. Prerequisites: MAT 242 (or 342), 274.

463 Transform Theory and Operational Methods. (3) N
Fourier, Laplace, and other transforms; applications to boundary value problems; generalized functions and modern operational mathematics. Prerequisite: instructor approval.

464 Numerical Analysis I. (3) F
Theory and methods for numerical solution of algebraic and transcendental equations; iteration methods; approximation; quadrature; solution of differential equations. Those seeking a methods survey course should take MAT 466. Prerequisites: MAT 342 and 371 and fluency in computer programming (preferably FORTRAN) *or* instructor approval. *General studies: N3.*

465 Numerical Analysis II. (3) S
Continuation of MAT 464. Prerequisite: MAT 464. *General studies: N3.*

466 Applied Computational Methods. (3) F, S
Numerical methods for quadrature, differential equations, roots of nonlinear equations, interpolation, approximation, linear equations, floating-point arithmetic, and roundoff error. Prerequisites: MAT 271 (or equivalent) and fluency in computer programming (preferably FORTRAN) *or* instructor approval. *General studies: N3.*

467 Computer Arithmetic. (3) S
Number systems, hardware/software arithmetic, overflow, significance, rounding, multiple precision, and automatic error control; impact on languages, architectures, robust programming, and software development. Prerequisite: CSE 101 or 200 or 383 or MAT 464 or 466 or instructor approval. *General studies: N3.*

472 Intermediate Real Analysis. (3) F
Introduction to analysis in metric spaces with emphasis on the real line. Appropriate as preparation for MAT 570. Prerequisites: MAT 300, 342.

475 Differential Equations. (3) S
Asymptotic behavior of solutions of linear and non-linear ordinary differential equations, stability, Sturm-Liouville problems, boundary value problems, and singular point behavior of autonomous systems. Prerequisite: MAT 242 (or 342), 274.

485 History of Mathematics. (3) N
Topics from the history of the origin and development of mathematical ideas. Prerequisite: MAT 272 or equivalent.

510 Point Set Topology. (3) F
Topological spaces, metric spaces, compactness, connectedness, local properties, product and decomposition spaces, mappings, covering properties, and separation properties. Prerequisite: MAT 371 or 410 or instructor approval.

511 Point Set Topology. (3) S
Continuation of MAT 510. Prerequisite: MAT 510 or instructor approval.

520 Numerical Linear Algebra. (3) A
Direct solution of linear systems, iterative methods, eigenvalues and eigenvectors, singular value decomposition, the QR algorithm, error propagation, arithmetic, and stability. Prerequisites: MAT 342 and 464 (or 466) *or* instructor approval.

521 Iterative Methods. (3) N
Numerical methods for solving linear/nonlinear systems of equations (symmetric, nonsymmetric). Iterative methods for linear systems, conjugate gradients, multigrid methods, preconditioning, Krylov methods. Prerequisites: MAT 371 and MAT 464 (or 466) *or* instructor approval.

523 Numerical Optimization. (3) N
Linear programming, unconstrained nonlinear minimization, line search algorithms, conjugate gradients, quasi-Newton methods, constrained nonlinear optimization, gradient projection, and penalty methods. Prerequisite: MAT 342 or 371 or 460 or 520 or equivalent or instructor approval.

524 Parallel Numerical Algorithms. (3) N
Algorithms for massively parallel, hypercube architectures; "parallel" FORTRAN; solution of linear, nonlinear systems; partial differential equations; iterative methods; multigrid; domain decomposition. Prerequisite: MAT 371 and 464 (or 466) *or* instructor approval.

526 Numerical Solution of Bifurcation Problems. (3) N
Nonlinear parameter-dependent differential, algebraic equations, numerical solutions; bifurcation, turning points; continuation methods, branch switching; steady-state, time-dependent cases; Hopf Bifurcation. Prerequisites: MAT 371 and 464 (or 466) *or* instructor approval.

528 Advanced Numerical Analysis. (3) N
Finite difference equations, orthogonal polynomials, quadrature, approximation and integration theory, numerical solution of differential equations, and numerical linear algebra. May be repeated for credit with instructor approval. Prerequisite: MAT 464 or instructor approval.

529 Advanced Numerical Analysis. (3) N
Continuation of MAT 528. Prerequisite: MAT 528 or instructor approval.

530 Numerical Solution of Ordinary Differential Equations. (3) N
One step, linear multistep methods; consistency, order, stability, convergence; discretization, round-off errors, error estimation, adaptive strategy; implementation, software for nonstiff equations. Prerequisites: MAT 371 and 464 (or 466) *or* instructor approval.

531 Numerical Solution of Stiff Differential Systems. (3) N
Runge-Kutta methods, order conditions, construction of highly stable methods, order stars, error estimation, stepsize selection, contractivity properties, linear multistep methods. Prerequisites: MAT 371 and 464 (or 466) *or* instructor approval.

533 Computational Elliptic and Parabolic Partial Differential Equations. (3) N
Parabolic and elliptic equations, finite difference, finite element methods, stability, consistency, convergence, practical aspects, applications, software. Prerequisites: MAT 371 and 464 (or 466) *or* instructor approval.

534 Computational Hyperbolic Partial Differential Equations. (3) N
Numerical solutions of hyperbolic PDEs, finite difference methods, well-posedness, stability, consistency, convergence, adaptive grids; Maxwell's equations, elastic wave propagation; Navier-Stokes. Prerequisites: MAT 371 and 464 (or 466) *or* instructor approval.

535 Spectral Methods for Partial Differential Equations. (3) N
Spectral, pseudo-spectral theory; Galerkin, collocation methods; Tau-methods, global approximation properties, stability; convergence; solutions for linear, nonlinear systems. Prerequisites: MAT 371 and 464 (or 466) *or* instructor approval.

536 Numerical Solution of Boundary Value Problems. (3) N
Difference methods, finite element methods, defect correction, irregular meshes, nonlinear problems, bifurcation, boundary layers, and sparse systems. May be repeated for credit with instructor approval. Prerequisites: MAT 371 (or 460 or 462) and 464 (or 466) *or* instructor approval.

543 Abstract Algebra. (3) F
Groups, modules, rings and fields, Galois theory, homological algebra, and the representation theory. Prerequisite: MAT 443 or instructor approval.

544 Abstract Algebra. (3) S
Continuation of MAT 543. Prerequisite: MAT 543 or instructor approval.

550 Variational Methods. (3) F
Calculus of variations and its applications to extremal problems, classical mechanics, and partial differential equations. Prerequisites: MAT 274 and 462 *or* equivalents.

551 Linear Operators and Integral Equations. (3) S
Bounded linear and compact operators on Hilbert spaces. Linear integral equations, Fredholm and Hilbert-Schmidt theory, and approximate methods. Distributions. Prerequisites: MAT 242 and 462 *or* equivalents.

569 Topics in Analysis. (3) N
May be repeated for credit with instructor approval. Prerequisite: instructor approval.

570 Real Analysis. (3) S
Lebesgue integration, selected function spaces, differentiation, abstract measure theory, and elements of functional analysis. Prerequisite: MAT 372 or instructor approval.

571 Real Analysis. (3) F
Continuation of MAT 570. Prerequisite: MAT 570 or instructor approval.

572 Complex Analysis. (3) F
Analytic functions, series and product representations, entire and meromorphic functions, normal families, Riemann mapping theorem, harmonic functions, and Riemann surfaces. Prerequisite: MAT 371 or instructor approval.

573 Complex Analysis. (3) S
Continuation of MAT 572. Prerequisite: MAT 572 or instructor approval.

574 Theory of Ordinary Differential Equations. (3) N
Systems, existence proofs, singularities, asymptotic behavior of solutions, boundedness of solutions, eigenvalues and eigenfunctions, and perturbation theory. Prerequisite: MAT 372 or instructor approval.

575 Theory of Ordinary Differential Equations. (3) N
Continuation of MAT 574. Prerequisite: MAT 574 or instructor approval.

576 Theory of Partial Differential Equations. (3) N
Existence and uniqueness theorems, boundary value and initial value problems, characteristics, Green's functions, maximum principle, distributions, and weak solutions. Prerequisite: knowledge of Lebesgue integration or instructor approval.

577 Theory of Partial Differential Equations. (3) N
Continuation of MAT 576. Prerequisite: MAT 576 or instructor approval.

578 Functional Analysis. (3) N
Locally convex, normed, and Hilbert spaces. Linear operators, spectral theory, and application to classical analysis. Prerequisite: MAT 472 or 571 or instructor approval.

579 Functional Analysis. (3) N
Continuation of MAT 578. Prerequisite: MAT 578 or instructor approval.

591 Seminar. (1–3) N
Topics may be selected from the following:
(a) Analysis
(b) Applied Mathematics
(c) Topology
(d) Algebra
(e) Mathematical Logic
(f) Numerical Analysis
(g) Combinatorial Mathematics

Omnibus Courses: See page 44 for omnibus courses that may be offered.

MATHEMATICS EDUCATION

MTE 180 Theory of Elementary Mathematics. (3) F, S, SS
Number systems, intuitive geometry, elementary algebra, and measurement. Intended for prospective elementary school teachers. Prerequisite: MAT 117 or equivalent.

181 Theory of Elementary Mathematics. (3) A
Continuation of MTE 180. Prerequisite: MTE 180 or instructor approval.

380 Arithmetic in the Elementary School. (3) A
Historical numeration systems, overview of elementary number theory, including primes, factorization, divisibility, bases, modular systems, linear congruence, and continued fractions. Prerequisite: MTE 181 or instructor approval.

381 Geometry in the Elementary School. (3) N
Informal geometry, including concepts of length, area, volume, similarity, and congruence. Classification of figures, straightedge and compass constructions, and motion geometry. Prerequisite: MTE 380 or instructor approval.

480 Mathematics in the Upper-Elementary Grades I. (3) N
An introduction to probability and statistics, including open-ended data gathering and processing, counting techniques, sampling strategies, estimation, and decision making. Prerequisite: MTE 381 or instructor approval.

481 Mathematics in the Upper-Elementary Grades II. (3) N
Elementary functions and their applications. A thorough investigation of some of the algorithms of basic arithmetic. Prerequisite: MTE 480 or instructor approval.

482 Methods of Teaching Mathematics in Secondary School. (3) F, SS
Examination of secondary school curricular material and analysis of instructional devices. Teaching strategies, evaluative techniques, diagnosis, and remediation and problem solving. Prerequisite: instructor approval.

483 Mathematics in the Secondary School. (3) S, SS
Topics in geometry, number theory, algebra, and analysis. Emphasis on unifying principles. Prerequisite: MAT 310 or instructor approval.

582 Modern Mathematics for Teachers. (3) A
Theory of sets, real number system, transfinite numbers, and other selected topics. Prerequisite: instructor approval.

583 Abstract Algebra for Teachers. (3) A
Postulational approach to algebra and elementary mathematical systems, including groups and fields. Prerequisite: instructor approval.

585 Modern Geometry for Teachers. (3) A
Euclidean, projective, and non-Euclidean geometries. Prerequisite: instructor approval.

587 Analysis for Teachers. (3) N
Subject matter in mathematics appropriate for accelerated programs in secondary schools, including analytic geometry and calculus. Prerequisite: instructor approval.

588 Analysis for Teachers. (3) N
Continuation of MTE 587. Prerequisite: MTE 587 or instructor approval.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

STATISTICS AND PROBABILITY

STP 226 Elements of Statistics. (3) F, S, SS
Basic concepts and methods of statistics, including descriptive statistics, significance tests, estimation, sampling, and correlation. Not open to majors in mathematics or the physical sciences. Prerequisite: MAT 114 or 117 or equivalent. *General studies: N2.*

326 Intermediate Probability. (3) F, S
Probability models and computations, joint and conditional distributions, moments, and families of distributions. Topics in stochastic processes, simulation, and statistics. Prerequisite: MAT 210 or equivalent. *General studies: N2.*

420 Introductory Applied Statistics. (3) F, S, SS
Introductory probability, descriptive statistics, sampling distributions, parameter estimation, tests of hypotheses, chi-square tests, regression analysis, analysis of variance, and nonparametric tests. Prerequisite: MAT 117 or equivalent. *General studies: N2.*

421 Probability. (3) F
Laws of probability, combinatorial analysis, random variables, probability distributions, expectations, moment generating functions, transformations of random variables, and central limit theorem. Prerequisites: MAT 300 and STP 420 *or* equivalents.

425 Stochastic Processes. (3) S
Markov chains, stationary distributions, pure jump processes, second order processes, and other topics in stochastic processes. Prerequisites: MAT 342; STP 421.

427 Mathematical Statistics. (3) S
Limiting distributions, interval estimation, point estimation, sufficient statistics, and tests of hypotheses. Prerequisite: STP 421.

429 Experimental Statistics. (3) S
Statistical inference for controlled experimentation. Multiple regression, correlation, analysis of variance, multiple comparisons, and nonparametric procedures. Prerequisite: STP 420 or equivalent. *General studies: N3.*

525 Advanced Probability. (3) N
Measure-theoretic foundations of probability, distribution functions and characteristic functions, laws of large numbers and central limit theorems, conditional probabilities, martingales, and topics in stochastic processes. Prerequisites: MAT 571 and STP 421 *or* instructor approval.

526 Theory of Statistical Linear Models. (3) F
Multinormal distribution, distribution of quadratic forms, full and nonfull rank models, generalized inverses, unbalanced data, variance components, and the large sample theory. Prerequisites: STP 427; knowledge of matrix algebra.

527 Theory of Statistical Linear Models. (3) S
Continuation of STP 526. Prerequisite: STP 526 or instructor approval.

530 Applied Regression Analysis. (3) F
Method of least squares, simple and multiple linear regression, polynomial regression, analysis of residuals, dummy variables, and model building. Prerequisite: STP 420 or equivalent.

531 Applied Analysis of Variance. (3) S
Factorial designs, balanced and unbalanced data, fixed and random effects, randomized blocks, Latin squares, analysis of covariance, and multiple comparisons. Prerequisite: STP 420 or equivalent.

532 Applied Nonparametric Statistics. (3) F
One sample test, tests of two or more related or independent samples, measures of correlation, and tests of trend and dependence. Prerequisite: STP 420 or equivalent.

533 Applied Multivariate Analysis. (3) S
Discriminant analysis, principal components, factor analysis, cluster analysis, and canonical correlation. Prerequisite: STP 420 or equivalent.

534 Applied Discrete Data Analysis. (3) N
Models for discrete and count data, measures of association, and log-linear and regression models for contingency tables. Prerequisite: STP 420 or equivalent.

591 Seminar. (1–3) N
Topics may be selected from the following:
(a) Statistics
(b) Probability

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Microbiology

Edward A. Birge
Chair
(LSE 210) 602/965–1457

PROFESSORS
BURKE, MOSSMAN, SCHMIDT

ASSOCIATE PROFESSORS
BIRGE, HOFFMAN, JACOBS

ASSISTANT PROFESSORS
MISRA, STOUT

CLINICAL FACULTY
DOWNS, LEFEVRE, MASS, ROBERTS

PROFESSORS EMERITI
JOHNSON, LEATHERS, NORTHEY, REEVES

MICROBIOLOGY—B.S.

This program consists of a minimum of 41 semester hours in microbiology and approved related fields. Students majoring in Microbiology are required to take the following courses: BIO 181, 182, 340; CHM 231 and 235 and 361 and 367 *or* CHM 331 and 332 and 335 and 336; MIC 206, 220, 302, 360, 401, 470; a minimum of eight semester hours of upper-division electives in microbiology or approved related fields. The eight hours must include one laboratory course. In addition, students are required to fulfill the university

numeracy requirements with MAT 210 (or 270 or 290) as their N1 course and BIO 420 (or any CSE course that meets the N3 requirement). The required supplemental courses are as follows: CHM 113, 115; PHY 111, 112, 113, 114.

CLINICAL LABORATORY SCIENCES—B.S.

The goal of the clinical laboratory sciences program is to prepare individuals to practice in the field of clinical laboratory sciences, which includes the major disciplines of clinical chemistry, hematology, immunohematology, and microbiology. Employment opportunities exist in hospital, private, physician, and research laboratories and in government, sales, management, and education. After obtaining a B.S. degree in Clinical Laboratory Sciences, the graduate is eligible for national certification by examination.

A student majoring in Clinical Laboratory Sciences is required to take 40 hours of clinical laboratory sciences courses. Also required are the following: CHM 113, 231, 361; MIC 205 (or 220), 206; ZOL 360. Equivalent courses may be substituted upon approval of advisor. Students must consult with the clinical laboratory sciences advisor to select general electives courses. Completion of the degree is dependent upon acceptance of the student into the accredited professional study program, which consists of 40 hours of clinical laboratory sciences courses. The university does not guarantee all students to be accepted into the professional study program due to space limitations at the clinical affiliates and restrictions of program accreditation. To obtain further information regarding acceptance procedures and program standards, contact the department for a program brochure. For proper course planning, students must meet with a clinical laboratory sciences advisor.

MINOR IN MICROBIOLOGY

The minor in Microbiology consists of a minimum of 24 semester hours. Required courses are as follows: BIO 181, 182, 340; MIC 206, 220, 302, 360. The remaining upper-division microbiology hours are chosen in consultation with an advisor.

GRADUATE PROGRAMS

The Department of Microbiology offers programs leading to the degrees of Master of Natural Science, Master of Science, and Doctor of Philosophy. Consult the *Graduate Catalog* for requirements.

The department participates in the new interdisciplinary program for the Master of Science and Doctor of Philosophy degrees in Molecular and Cellular Biology. See page 140 for courses. For more information, contact Dr. Allan L. Bieber, PS D121, 602/965–3595.

MICROBIOLOGY

MIC 205 Microbiology. (3) F, S, SS
Basic course for persons without credit in BIO 181, emphasizing general principles; role of microorganisms in health, ecology, and applied fields. Prerequisites: BIO 100 (or BOT 108) and CHM 101 *or* instructor approval. May not be used for Microbiology major credit unless a diagnostic test is passed. *General studies: S2 (if taken with MIC 206).*

206 Microbiology Laboratory. (1) F, S, SS
Principles and laboratory techniques used in identifying and handling microorganisms. 3 hours lab. Pre- or corequisite: MIC 205 or 220. *General studies: S2 (if taken with MIC 205).*

220 Biology of Microorganisms. (3) F, S
Basic course for persons with credit in BIO 181. Detailed study of microbial cells, their structure, genetics, physiology, and taxonomy. Corequisites: BIO 182; CHM 115.

302 Advanced Bacteriology Laboratory. (2) S
Advanced laboratory techniques in bacterial growth, physiology, genetics, microscopy, and basic virology. Required of microbiology majors. 4 hours lab. Prerequisites: Completion of L1 requirement and either A or B. (A) MIC 206, 220 or (B) MIC 205 and 206 *or* instructor approval. *General studies: L2 (if credit also earned in MIC 401).*

360 Bacterial Physiology. (3) F
Mechanisms and control of cell metabolism, structures, and functions. Prerequisite: MIC 220. Pre- or corequisite: CHM 361 or instructor approval.

381 Pathogenic Microbes. (3) S
Host-microbial interactions in infectious disease, with emphasis on pathogenesis, host defenses, and molecular mechanisms of microbial virulence. Prerequisite: MIC 360 or 6 hours of microbiology with instructor approval.

401 Research Paper. (1) F, S, SS
A paper of 15 or more pages based on library or laboratory research in collaboration with a faculty member. Required of all Microbiology majors. Prerequisites: MIC 302; completion of L1 requirement. *General studies: L2 (if credit also earned in MIC 302).*

420 Introductory Immunology. (3) F
Fundamental concepts in research and medicine. Cellular immunity, antibody and antigen, immunogenetics, immunoregulation, hypersensitivity, clinical immunology, and nervous-immune system interactions. Prerequisites: CHM 231 (or 331) and MIC 205 (or 220) *or* instructor approval.

421 Experimental Immunology. (2) F, S
An introduction to the basic techniques, methods, and assays used in immunology. 6 hours lab. Prerequisites: CHM 231 and 331 and MIC 302 *or* instructor approval.

425 Advanced Immunology. (3) S
A survey of recent advances in immunology, including lymphocyte membranes, lymphokines/biochemistry, molecular genetics, theoretical immunology, immunoregulation, neuro-immunology, and immunologic diseases. Prerequisite: MIC 420 or instructor approval.

441 Bacterial Genetics. (3) S
Survey of genetic exchange and regulatory processes in bacteria and their viruses. Bacteria and viruses as tools in genetic engineering. Prerequisites: BIO 340 and MIC 205 (or 220) *or* instructor approval.

442 Bacterial Genetics Laboratory. (1) F
Techniques of mutagenesis, mapping, and strain construction. 4 hours lab. Prerequisites: MIC 206, 302. Pre- or corequisite: MIC 441.

470 Bacterial Diversity and Systematics. (3) F
Enrichment culture, biology, and classification of the nonpathogenic bacteria. 1 hour lecture, 6 hours lab. Prerequisite: MIC 302.

485 General Virology. (3) F '94
Fundamental nature of viruses, their replication, pathogenesis, and ecology. Prerequisites: BIO 340 and CHM 331 *or* instructor approval.

486 General Virology Laboratory. (2) N
An introduction to the growth, assay, and detection of viruses. 6 hours lab. Prerequisite: MIC 302. Pre- or corequisite: MIC 485.

527 Neuroimmunology. (3) S '95
Studying mind's influence on immunity and the immune system's influence on the mind, neuroimmunologic diseases, and the neuroimmunological circuitry involved. Seminar. Prerequisite: MIC 420 or instructor approval.

530 Bacterial Differentiation. (3) N
Molecular biology of sporulation and germination in bacteria. Emphasis on the control of cellular differentiation. Prerequisite: BIO 443 or MIC 441 or instructor approval.

545 Recombinant DNA Methodology. (3) N
Principles of genetic engineering using in vitro DNA recombination; characteristics of plasmid and phage vectors; recombinant selection and physical characterization. Prerequisites: BIO 443; MIC 441; instructor approval.

546 Recombinant DNA Laboratory. (2) N
Basic techniques in isolation of chromosomal, plasmid, and bacteriophage DNA; transformation; gene-splicing methods. Corequisite: MIC 545.

581 Molecular Mechanism of Pathogenesis. (3) F
Pathogenic mechanisms and host responses in bacterial diseases. Prerequisites: MIC 381 and 420 *or* instructor approval.

585 Molecular Virology. (3) S '96
Selected topics concerning molecular aspects of eukaryotic virus replication and pathogenesis. Prerequisite: instructor approval.

591 Seminar. (1–3) F, S
Topics may be selected from the following:
(a) Current Research in Microbiology
(b) Molecular Virology
(c) Enzymology
(d) Genetics
(e) Genetic Engineering
(f) Immunology
(g) Neuroimmunology
(h) Bacterial Ecology
(i) Pathogenic Bacteriology

Omnibus Courses: See page 44 for omnibus courses that may be offered.

CLINICAL LABORATORY SCIENCES/ MEDICAL TECHNOLOGY

CLS 100 Introduction to Clinical Laboratory Sciences. (1) F
Introduction to the field of clinical laboratory sciences. Required for Clinical Laboratory Sciences majors.

Enrollment for the following CLS classes is restricted to students admitted to the Clinical Laboratory Sciences Professional Study Program.

310 Principles of Clinical Chemistry I. (6) S
Theory and application of principles of clinical chemistry, with emphasis on laboratory techniques, pathophysiology, methods of analysis, and assessment of procedure. 3 hours lecture, 9 hours lab.

320 Principles of Clinical Microbiology I. (6) S
Emphasizes disease mechanisms, isolation, and identification of medically significant fungi and bacteria. Includes principles of laboratory safety and quality control. 3 hours lecture, 9 hours lab.

330 Principles of Clinical Hematology I/ Body Fluids. (3) F
Theory and application of principles in hematology, with emphasis on techniques to evaluate blood dyscrasias and analyze body fluids. 2 hours lecture, 3 hours lab.

410 Principles of Clinical Chemistry II. (2) SS
Continuation of Clinical Chemistry I, with emphasis on principles of automation, laboratory computers, and method evaluation. 1 hour lecture, 3 hours lab.

411 Advanced Applications of Clinical Chemistry. (4) F
Clinical application of theory/techniques from Principles of Clinical Chemistry. Emphasis on operation of common laboratory instrumentation, clinical correlation, and radioimmunoassay. Minimum 180 hours practicum.

420 Principles of Microbiology II. (2) SS
Disease mechanisms and identification of medically significant parasites. Mycobacteria, Actinomyces, Chlamydia, Rickettsia, Mycoplasma, and viruses. 1 hour lecture, 3 hours lab.

421 Advanced Applications of Clinical Microbiology. (4) S
Practical laboratory application of the principles of specimen collection, processing, detection, identification, and antimicrobial testing of medically significant bacteria, fungi, and parasites. Minimum 180 hours practicum.

430 Principles of Clinical Hematology II/Hemostasis. (3) F
Theory and applications of principles in hematology with emphasis on etiology, pathophysiology, clinical manifestations, and treatment of blood dyscrasias/hemostatic defects. 2 hours lecture, 3 hours lab.

431 Advanced Applications of Clinical Hematology. (4) S
Practical laboratory application of methods/ techniques used to evaluate and diagnose blood dyscrasias/hemostatic defects. Applied techniques in Body Fluid Analysis. Minimum 180 hours practicum.

440 Principles of Clinical Immunology/Immunohematology. (4) F
Theoretical and practical application of clinical immunology and immunohematology. Emphasizes serological techniques that aid disease diagnosis and blood donor selection. 3 hours lecture, 3 hours lab.

441 Advanced Applications of Clinical Immunology/Immunohematology. (3) S
Practical laboratory application of the principles of serological methods used in diagnosing disease and selecting blood components for transfusion therapy. Minimum 135 hours practicum.

450 Principles of Clinical Laboratory Administration. (2) F, S
Principles of management, with emphasis on the clinical laboratory. Basic management process, personnel supervision, identification, and allocation of resources. Both CLS 450 and 460 must be taken to secure L2 credit. *General studies: L2.*

460 Principles of Clinical Laboratory Education. (1) S
Principles of learning, with application to the development of instructional objectives, strategies, and evaluation for teaching-learning situations in the laboratory. Both CLS 450 and 460 must be taken to secure L2 credit. *General studies: L2.*

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Military Science
Army ROTC

Stephen J. Heynen, Lt. Col.
Chair
(MAIN 240) 602/965–3318

PROFESSORS
DALGLEISH, HEYNEN

ASSISTANT PROFESSORS
POLLOCK, RAKOWSKI, SMITH

INSTRUCTORS
COX, GARRISON, POLLOK, RINGENOLDUS, WHITAKER

PURPOSE

The Department of Military Science curriculum consists of the basic course (MIS 101, 102, 201, and 202) and the advanced course (MIS 301, 302, 401, and 402). The goal of this professional education is to prepare selected students with the leadership potential to be commissioned Army officers. Objectives include developing the following characteristics in the students: their leadership and managerial skills; their abilities to think creatively; their abilities to speak and write effectively; their appreciation of the requirements for national security; and their understanding of the nature and functions of the U.S. Army. Upon successful completion of the advanced course and graduation, qualified students receive commissions in the Active Army (on a competitive basis), U.S. Army Reserve, or Army National Guard.

Commissions as second lieutenants in the Regular Army are available to outstanding students who demonstrate the highest qualities of leadership potential and academic excellence.

In addition to the Military Science curriculum, core courses in the field of national defense studies are both an integral and parallel source of the department's program. Integrally, they provide MIS courses at all levels with topical intensity and highlighting in such professionally related areas as military technology; weapons procurement; national intelligence, secrecy, and counter-intelligence; civil-military relations; security coalitions and regional defense communities; national, regional, and global levels of strategy; generalship skill-in-action; deterrence dynamics and structure; military doctrine; service-branch livelihood, appropriations rivalry, and interservice cooperation; personnel recruitment, morale, training, advancement, and bureaucratic organization; military reform; threat and threat perception; military-historical experience and analogy; media and biographical insights; the rationale and matrices of security analysis and research; and independently selectable topics.

The department also fields an independent but parallel set of 400-level courses in the areas of geostrategic, politico-strategic, and national defense policy and analysis—available to students irrespective of Reserve Officers' Training Corps (ROTC) status, departmental major, or college affiliation— for assigned credit toward general studies, social science, and global awareness requirements for graduation. Special emphasis is laid upon a single-semester course in Soviet foreign and

national defense policy and analysis, and a variable accredited course available for appropriately qualified students (see catalog qualifications for independent study and research) in independent study and research in national defense policy and analysis.

GENERAL QUALIFICATIONS

Basic Course. Any student who is enrolled in ASU (or approved by the professor of military science) can enter into military science basic classes. It is strongly recommended that the student be in sound physical shape because some of the curriculum requires physical exertion.

Advanced Course. Any student who is enrolled in ASU (or approved by the professor of military science) may enroll in military science advanced classes. However, to be competitive and obtain a commission in the U.S. Army, students must meet the following requirements:

1. be a citizen of the United States (noncitizens may enroll but must obtain citizenship before commissioning);
2. be of sound physical condition and pass the U.S. Army physical fitness test;
3. meet the required professional military educational requirements; and
4. be at least 17 years of age for entrance into the advanced course and be able to complete all commissioning requirements before age 30.

Only those students in the basic and advanced courses who meet required military regulations are eligible to receive financial assistance through the U.S. Army. Members of the Department of Military Science are available during normal office hours to answer questions or provide counseling.

The following are various options that are open to students who wish to obtain a commission in the U.S. Army. Contact a professor of military science for more information.

Four-Year Program. Students may enroll in Army ROTC during their freshman year. They take the basic course during the first two years, receiving a total of 12 semester hours of credit for four semesters of study. Upon satisfying the requirements stated above, they enter the advanced course, where they earn 12 additional semester hours for four semesters of study. Students are also required to attend a six-week advanced summer camp at Ft. Lewis, Washington, between their junior and senior years. All commissioned officers must meet certain Professional Military Education requirements by completing courses in English, math, and computer literacy. Selected majors such as nursing, engineering, and architecture, among others, may require an additional semester or two, or summer school, to complete all the requirements for a degree and a commission and to preclude excessive course overloads. Upon successful completion of the advanced course and requirements for a degree, students are commissioned as second lieutenants in the Regular Army, U.S. Army Reserve, or Army National Guard.

Two-Year Program. Students must have at least two academic years of college work remaining, either at the undergraduate or graduate level. The student must also have junior status. This program is open to all students with the exception of three- and four-year scholarship winners (see "Scholarship Programs"). Students seeking enrollment in the two-year program should make application during the spring semester of the calendar year in which they desire to enter the program. They must pass the ROTC Qualifying Examination and the Army physical fitness examination. After successfully completing a paid six-week basic camp at Fort Knox, Kentucky (conducted during June, July, and August), students may enroll in the advanced course. Students who have previous military experience or who are currently members of the National Guard or Reserves may be admitted directly into the two-year program. They then follow the same program and meet the same requirements as stated for advanced course students in the four-year program.

Qualifications for Admittance to the Advanced Course. The following qualifications are required for admittance to the advanced course:

1. successful completion of the basic course for the students in the four-year ROTC program; for the students in the two-year program, selection for and completion of the six-week basic summer camp;
2. passing the ROTC Qualifying Examination;
3. passing the Army physical examination;
4. achieving and maintaining the minimum cumulative GPA required for graduation in the student's selected major;
5. attainment of at least sophomore class standing; and
6. maintenance of full-time student status.

Pay and Allowances. Each advanced course student receives one-half the pay of a second lieutenant during attendance at the six-week advanced camp. Uniforms, housing, and meals are provided at camp without cost to the students, and they are reimbursed at the current mileage rate for travel to and from the camp. Students who attend basic camp receive the pay of an army recruit during attendance at basic camp as well as the current mileage rate for travel to and from the camp. All students in the advanced course, regardless of scholarship status, are paid about $1,000 tax-free for each of these two years.

Simultaneous Membership Program. Under this program, ROTC students may simultaneously be members of the Army Reserves or the National Guard. The combination of advance course allowance and pay for Reserve or Guard participation provides more than $1,000.00 for each semester's involvement.

Military Construction Option. The Department of Military Science and the Department of Construction of the College of Engineering and Applied Sciences have jointly developed the military construction degree option. It is composed of 70% technical studies and 30% electives in the areas of planning, management, and organization. It is distinctly military in orientation and is designed to prepare graduates to plan, manage, and direct large-scale construction projects, such as roads, dams, air fields, bridges, and other public works. ROTC cadets enrolled in this program receive credit toward the degree for all military science courses (24 semester hours). Upon completion of the 132-hour program, cadets graduate with a Bachelor of Science degree in Construction.

Scholarship Programs. The Army ROTC offers scholarship programs for outstanding young men and women who are motivated toward a career as professional officers in the Regular Army. These scholarships pay for all fees and tuition and provide $100.00 per month subsistence allowance while the scholarship is in effect. In addition, a flat rate is paid each semester toward the purchase of texts and some academic supplies. A scholarship for four years is available to freshmen who enter the four-year program. Applications must be submitted in accordance with a schedule furnished by high school counselors. Selection is made on a nationwide basis. Scholarships are also available for three- and two-year periods, commencing with the sophomore and junior years of ROTC respectively. Applications are open to all students in good standing with the university; previous ROTC or military experience is not required for application for three- and two-year scholarships. Selection is made by a review board at the national level. Acceptance of any of the three scholarship programs requires a service commitment to serve in the active army for a period of up to four years after commissioning and graduation.

Active Duty Requirements. Graduates of Army ROTC may serve as officers in the Active Army, Army National Guard, or Army Reserves. Active duty commitments may vary from four years to as little as three months. Scholarship students have up to a four-year active duty commitment.

Graduate and Professional Studies Programs. A delay from call to active duty for up to four years is available to outstanding students who desire to earn graduate or professional degrees. Special programs for graduate and professional studies are available to both Regular Army appointees and U.S. Army Reserve appointees in the following areas: medicine, osteopathy, and clinical psychology.

MILITARY SCIENCE

MIS 101 Introduction to the Military. (3) F
Overview of mission, organization, and structure of the Army and its role in national defense; discussion of current military issues. 3 hours lecture/conference, 2 hours lab.

102 Land Navigation, First Aid, and Survival. (3) S
Introduction to military maps and land navigation; first aid, and life-saving techniques; basic outdoor survival skills. 3 hours lecture/conference, 2 hours lab.

201 American Military History. (3) F
A study of the role of the military in American life during war and peace from colonial times to the present day. 3 hours lecture/conference, 2 hours lab.

202 Introduction to Leadership Dynamics. (3) S
Introduction to interpersonal dynamics involved in military team operations; theory and application of military leadership principles. 3 hours lecture/conference, 2 hours lab.

205 ROTC Basic Camp. (4) SS
Six-week training program emphasizing practical hands-on skills and leadership development. Taken in lieu of MIS 101, 102, 201, 202. Conducted at Fort Knox, Kentucky.

294 Special Topics. (1–4) F, S

301 Advanced Military Science I. (3) F
Theory and dynamics of the individual soldier and military units in offensive combat operations. 2 hours lecture-conferences, 1.5 hours of Leadership Practical Application, 1 2-day field exercise, 3 1-day field exercises. Prerequisites: MIS 101 and 102 and 201 and 202 *or* equivalent. Corequisite: EPE 105 Army Master Fitness.

302 Advanced Military Science II. (3) S
Theory and dynamics of military units in defensive combat operations. 2 hours lecture-conferences, 1.5 hours Leadership Practical Application, 1 3-day field exercise, 2 1-day field exercises. Prerequisites: MIS 101 and 102 and 201 and 202 *or* equivalents. Corequisite: EPE 105 Army Master Fitness.

303 ROTC Advanced Camp. (4) SS
6-week training program emphasizing leadership development and advanced military skills, including tactics, land navigation, and physical training. Conducted at Fort Lewis, Washington. Prerequisites: MIS 301, 302.

394 Special Topics. (1–4) F, S

401 Advanced Military Science III. (3) F
The military legal system; preparation and conduct of military training; leadership development; ethics and professionalism of the military officer. 3 hours lecture-conferences, 2 hours Leadership Practical Application, 1 2-day field exercise, 3 1-day field exercises. Prerequisites: MIS 301, 302. Corequisite: EPE 105 Army Master Fitness.

402 Advanced Military Science IV. (3) S
Military correspondence; career planning and personal affairs in service; conduct of training; leadership development; ethics and professionalism of the military officer. 3 hours lecture, 2 hours Leadership Practical Application, 1 3-day field exercise, 2 1-day field exercises. Prerequisites: MIS 301, 302. Corequisite: EPE 105 Army Master Fitness.

410 American Defense Policy I. (3) F
Evolution, organization, and execution of U.S. national security policy.

412 American Defense Policy II. (3) S
Contemporary problems and analytical issues in the formation and implementation of U.S. national security. Prerequisite: MIS 410.

414 Comparative Defense Policy Analysis. (3) F
Historical problems and analytical issues in the evolution, organization, application, and control of effective military establishments in various political systems.

416 Soviet/C.I.S. Foreign and Defense Policies. (3) S
Analysis of foreign and security policies of the Soviet Union/C.I.S. and of the successor states to the Warsaw Pact.

499 Independent Study: National Defense Analysis. (1–3)

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Molecular and Cellular Biology

Allan L. Bieber
Director, Executive Committee
(PS D121) 602/965–0743

PROFESSORS
ARONSON, BACKHAUS, HOOBER, TRELEASE (Botany); BIEBER, BLANKENSHIP, LOHR, ROSE (Chemistry and Biochemistry); BURKE, SCHMIDT (Microbiology); CHANDLER, DOANE, HAZEL, KAMMER, McGAUGHEY, SATTERLIE (Zoology)

ASSOCIATE PROFESSORS
STUTZ, VERMASS (Botany); JACOBS (Microbiology); CAPCO, GOLDSTEIN, HOFFMAN, SMITH (Zoology)

ASSISTANT PROFESSORS
FRASCH, LoBRUTTO, ROBERSON, WEBBER (Botany); ALLEN, WOODBURY (Chemistry and Biochemistry); HOFFMAN, MISRA, STOUT (Microbiology); COOPER (Zoology)

PROFESSOR EMERITUS
REEVES (Microbiology)

The interdisciplinary M.S. and Ph.D. degrees with a major in Molecular and Cellular Biology are administered by the Committee on Molecular and Cellular Biology. The participating faculty are drawn primarily from four core departments (the Departments of Botany, Chemistry and Biochemistry, Microbiology, and Zoology), with additional

faculty from the Departments of Anthropology and Physics and Astronomy. One striking aspect of studies in this broad area of biological science is the interdisciplinary nature of the field. Similar approaches and techniques are used for studies of biological systems whether they are viral, bacterial, plant, or animal.

The graduate degrees offered by the faculty through this program prepare students for careers that span traditional disciplinary boundaries. The broad-based training provides the necessary skills for professional careers in academic institutions, governmental institutions, and industry, particularly those related to health and chemical sciences.

For more information, contact the director or refer to the *Graduate Catalog*.

MOLECULAR AND CELLULAR BIOLOGY

MCB 500 Research Methods in Molecular and Cellular Biology. (2) F, S
Rotation laboratory experiences in which students participate in research under the direction of an MCB faculty member. May be repeated for credit.

501 Seminar: Molecular and Cellular Biology Colloquium. (1) F, S
Presentation of current research by noted researchers in the field. May be repeated for credit.

555 Advanced Molecular and Cellular Biology I. (3) F
Study of structural and functional organization of biomolecules and cells, based on current literature. 3 hours lecture/discussion. Pre- or corequisites: BIO 443 or equivalent; CHM 461.

556 Advanced Molecular and Cellular Biology II. (3) S
Continuation of MCB 555. 3 hours lecture, discussion. Pre- or corequisites: BIO 432 or equivalent; CHM 462.

591 Seminar: Current Literature in Molecular and Cellular Biology. (1) F, S
Presentation and discussion of current research in the areas of molecular and cellular biology. May be repeated for credit.

700 Research Methods in Molecular and Cellular Biology. (2) F, S
Rotation laboratory experiences in which students participate in research under the direction of an MCB faculty member. May be repeated for credit.

701 Seminar: Molecular and Cellular Biology Colloquium. (1) F, S
Presentation of current research by noted researchers in the field. May be repeated for credit.

791 Seminar: Current Literature in Molecular and Cellular Biology. (1) F, S
Presentation and discussion of current research in the areas of molecular and cellular biology. May be repeated for credit.

Omnibus Courses: See page 44 for omnibus courses that may be offered.

Philosophy

Jane Maienschein
Chair
(PS A524) 602/965–3394

PROFESSORS
CREATH, FITCH, HUMPHREY, MAIENSCHEIN, MURPHY, WHITE

ASSOCIATE PROFESSORS
COHEN, GULESERIAN, KOBES, McGREGOR

ASSISTANT PROFESSORS
ARMENDT, COWLES, DE MARNEFFE, DRESSER, REYNOLDS

PROFESSORS EMERITI
ARNER, CARNEY, GIESCHEN, HOWELLS, LIU, VOTICHENKO

PHILOSOPHY—B.A.

The major in Philosophy consists of 45 semester hours, 39 of which must be upper-division hours. In exceptional cases, up to nine units may be in related fields as approved by the undergraduate advisor. Required courses are as follows: PHI 301, 302, 305, 312 (or 314), 316 (or 317), 333, 350; at least two PHI 400-level courses not to include 492, 493, or 499, except with special permission of the chair.

Students planning to do graduate work in philosophy should consult an advisor in order to develop an appropriate selection of courses at the 300 and 400 levels. A minimum grade of "C" is necessary for each course used to fulfill the major requirements. See "Degree Requirements," page 87.

History and Philosophy of Science.
The Department of Philosophy offers courses bearing the HPS prefix. With the consent of the director of undergraduate studies, these courses may be taken to satisfy the requirements of the Philosophy major.

MINOR IN PHILOSOPHY

A minor in Philosophy consists of 18 semester hours, of which at least 12 must be upper division and approved by an advisor in the department. All courses must be passed with a minimum grade of "C."

GRADUATE PROGRAM

The Department of Philosophy offers a graduate program leading to the de-gree of Master of Arts that prepares one for either teaching in a community college or pursuing a Ph.D. in Philosophy. Consult the *Graduate Catalog* for requirements.

PHILOSOPHY

PHI 101 Introduction to Philosophy. (3) F, S, SS
Exploration of issues which philosophers have traditionally considered, including morality, reality, and knowledge. *General studies: HU.*

103 Principles of Sound Reasoning. (3) F, S, SS
Fallacies, validity, and soundness of arguments. May include syllogistic, elementary symbolic, inductive logic, and scientific method. *General studies: L1, HU.*

301 History of Ancient Philosophy. (3) F
History of western philosophy from its beginnings through the Hellenistic period. *General studies: HU, H.*

302 History of Modern Philosophy. (3) S
History of western philosophy from the Renaissance through Kant. *General studies: HU, H.*

304 Existentialism and Phenomenology. (3) N
An introduction to this movement through a study of its major figures, e.g., Kierkegaard, Dostoyevski, Nietzsche, Husserl, Heidegger, Buber, Sartre, Camus, Merleau-Ponty, Binswanger, May, Frankl, and Ricouer. *General studies: HU.*

305 Contemporary Ethics. (3) A
Current theories about the nature of morality (metaethics) and about what is right and wrong (normative ethics). Prerequisite: PHI 306 or 307 or instructor approval. *General studies: HU.*

306 Applied Ethics. (3) F, S, SS
Philosophical discussion of contemporary moral and political issues, such as abortion, euthanasia, animal rights, affirmative action, and sexual rights. *General studies: HU.*

307 Philosophy of Law. (3) A
The nature and source of law and its relation to morality. Legal rights, legal enforcement of morals, civil disobedience, liability and responsibility, punishment, judicial reasoning, justice, property, and differences between theories of natural and positive law. *General studies: HU.*

308 Philosophy of Art. (3) A
Central problems in philosophy of art, e.g., the nature of a work of art, modern and traditional theories of art, aesthetic perception and experience, and objectivity and relativity in art criticism. *General studies: HU.*

309 Social and Political Philosophy. (3) A
Alternative principles and methods relevant to problems of human association and conflict; justice and power, freedom and equality, and autonomy and order are discussed. Prerequisite: PHI 305 or instructor approval. *General studies: HU.*

310 Environmental Ethics. (3) A
Examination of a full range of philosophical positions pertaining to our moral relationship to the natural world; anthropocentrism, individualism, biocentrism.

311 Philosophy in Literature. (3) A
Selected works of literature introduce philosophical problems such as the nature of moral goodness and people's relation to the world and other people. *General studies: HU.*