

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences. Letter grade or S/NC.

594-95 French Directed Readings (3,3)

600 Doctoral Research and Dissertation (3-15) P/ NP only. E

610 Doctoral Seminar in French and Francophone Studies, or Linguistics (3) Content varies. May be repeated. Maximum 12 hrs with consent of department.

German

GRADUATE COURSES

331-32 Elements of German for Upper-Division and Graduate Students (3,3) Elements of language, elementary and advanced readings, and a final 10,000 word translation project. Open to graduate students preparing for language examinations, and upper-division students desiring reading knowledge of the language. No credit for students having completed 101-02. 332 may be repeated. Maximum 6 hrs. Undergraduate credit only.

411-12 Advanced Conversation and Composition (3,3) Prereq: 311-12 or equivalent or consent of department.

415 Special Topics (3) Topics vary. May be repeated. Maximum 6 hrs.

420 Selected Topics in German Literature from 1750 to the Present (3) Prereq: 6 hrs of 300-level courses (excluding 331-32 and courses in English translation) or equivalent.

421 German Lyric Poetry (3) Prereq: 6 hrs of 300-level courses (excluding 331-32 and courses in English translation) or equivalent.

422 German Drama (3) Prereq: 6 hrs of 300-level courses (excluding 331-32 and courses in English translation) or equivalent.

423 German Narrative Prose (3) Prereq: 6 hrs of 300-level courses (excluding 331-32 and courses in English translation) or equivalent.

424 German Literary Movements (3) Survey of major periods in development of German literature since 1750: problems and pitfalls of periodization.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, Spanish 425, and Linguistics 425.)

426 Methods of Historical Linguistics (3) Phonetics, distinctive feature analysis, sound change types, nature of sound change, principles of reconstruction, and fundamental assumptions about language change through time. Survey of non-phonological linguistic change, language families, Proto-Indo-European, and other proto languages. Prereq: 6 hrs of upper division foreign language courses (excluding courses in translation or graduate reading courses). (Same as French 426, Spanish 426, and Linguistics 426.)

435 Structure of the German Language (3) Contrastive English-German segmental and suprasegmental phonemes, contrastive English-German linguistic structures, selected topics in advanced German grammar and syntactic analysis. Prereq: 6 hrs of upper division German language courses (excluding courses in translation and graduate reading courses). (Same as Linguistics 435.)

436 History of the German Language (3) Development of German language from Indo-European through Proto-Germanic, Old High German, Middle High German to New High German. Internal and external linguistic history of German speech. Prereq: 6 hrs of upper division German language courses (excluding courses in translation or graduate reading courses). (Same as Linguistics 436.)

485 Business German (3) Survey of German used in fields of business, government, administration, and

economics. Prereq: 6 hrs of upper-division German excluding courses in translation and graduate reading courses.

500 Thesis (1-15) P/ NP only. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

510 German Phonetics and Advanced Grammar (3) Advanced work in phonetics, pronunciation, and selected topics in German grammar. For teachers and prospective teachers. Prereq: Consent of instructor.

512 Teaching a Foreign Language (3) Practical application of methods for teaching and evaluating basic language skills and foreign language skills, and cultural knowledge through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all M.A. and Ph.D. students holding GTAs, except those whose previous training or experience warrants excuse by department.

519 Bibliographical Methods (1) Bibliographical methods, major reference works and bibliographical problems in language and literature.

520 Proseminar (2) Advanced training in use of bibliographical and reference tools; illustrative problems; paper preparation.

541 Medieval German Language and Literature (3) Introduction to Middle High German.

550 Studies in German Literature (3) Content varies. May be repeated. Maximum 6 hrs.

552 German Enlightenment, Rococo, and Sturm und Drang (3) Content varies. May be repeated. Maximum 6 hrs.

553 German Classicism and Romanticism (3) Content varies. May be repeated. Maximum 6 hrs.

554 German Realism and Naturalism (3) Content varies. May be repeated. Maximum 6 hrs.

555 Modern German Literature 1890-1945 (3) Content varies. May be repeated. Maximum 6 hrs.

556 Modern German Literature 1945-Present (3) Content varies. May be repeated. Maximum 6 hrs.

560 German Literary Theory and Criticism (3)

561-62 Directed Readings in German Language and Literature (3,3)

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences. Letter grade or S/NC.

600 Doctoral Research and Dissertation (3-15) P/ NP only. E

621-22 Seminar in German Literature (3,3) May be repeated. Maximum 18 hrs.

631-32 Seminar in German and Germanic Philology (3,3)

Italian

GRADUATE COURSES

401 Dante and Medieval Culture (3) Introduction to significance of this great Italian writer. Prereq: 212 or consent of instructor.

402 Petrarch and Boccaccio (3) Prereq: 212 or consent of instructor.

403 Literature of the Rinascimento (3) From Pulci to Tasso, Quattrocento and Cinquecento. Prereq: 212 or consent of instructor.

405 Modern Italian Poetry (3) From Pascoli to Montale. Prereq: Italian 212 or consent of instructor.

406 The Modern Italian Novel (3) From Manzoni to Calvino. Prereq: 212 or consent of instructor.

409 Directed Readings (3)

410 Italian Theatre (3) Survey of Italian theatre from Renaissance to present. Prereq: Intermediate Italian or consent of instructor.

421 Topics in Italian Literature and Cinema (3) Italian literature and cinema from 1930 to present focusing on literary works translated into English and adapted into film. Investigation of relationship between literature and cinema and achievement of greater understanding of Italian culture since 1930. Films in Italian with English subtitles. May be repeated. Maximum 6 hrs. (Same as Cinema Studies 421.)

510 Readings in Italian Literature (3) Topics vary. May be repeated with consent of department.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

Portuguese

GRADUATE COURSES

400 Portuguese for Speakers of Another Romance Language (3) Accelerated class for beginning students of Portuguese with strong background in another Romance language. Introduction to grammar, reading and culture of Portugal and Brazil. Prereq: 3 hours at 300-level in another Romance language or equivalent.

431-32 Topics in the Literature & Language of Portuguese-speaking World (3,3) Outstanding works of literature and culture from Portuguese countries. Topics may vary. Prereq: At least one course at the 300 level or the equivalent. May be repeated. Maximum 12 hrs.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

Russian

GRADUATE COURSES

401-02 Advanced Grammar, Conversation, and Composition (3,3) Prereq: Russian Composition and Conversation or equivalent.

430 Selected Topics in Russian Literature (3) Content varies. May be repeated. Maximum 9 hrs.

451-52 Senior Seminar (3,3) For majors in Russian; minors admitted at discretion of instructor. Intensive study of language, literary style, and literary criticism based on selected major novels.

510 Russian Phonetics and Advanced Grammar (3) Phonetics, pronunciation, stylistics, and selected topics in Russian grammar. For teachers and prospective teachers. Prereq: Consent of instructor.

550 Studies in Russian Literature (3) Content varies. May be repeated. Maximum 9 hrs.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

Spanish

GRADUATE COURSES

421 Phonetics (3) Prereq: Intermediate Conversation and Composition or consent of instructor.

422 Advanced Grammar and Translation (3) Structure of grammatical system of Spanish. In-depth analysis of selected syntactic phenomena with practical illustration/application and exercise in Spanish-English and English-Spanish translation. Finer points of grammatical structures. Not available to native or bilingual students of Spanish without consent of department. Prereq: 323 Intermediate Composition and Grammar.

423 Advanced Composition and Conversation (3) Development of writing and speaking skills at advanced level, wide range of topics and situations. Variety of in-class and extra-class activities. Not available for credit for students whose level of proficiency in Spanish is superior as defined by the ACTFL Proficiency Guidelines or for graduate students in the Spanish M.A. or Ph.D. programs. Prereq: 323 Intermediate Composition and Grammar or consent of department.

425 Introduction to Descriptive Linguistics (3) (Same as French 425, German 425, and Linguistics 425.)

426 Methods of Historical Linguistics (3) (Same as German 426, French 426, and Linguistics 426.)

429 Romance Linguistics (3) (Same as French 429 and Linguistics 429.)

430 Topics in Hispanic Linguistics (3) Spanish language through different areas of linguistics: phonology, morphology, syntax, semantics, sociolinguistics, dialectology and second language acquisition. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-Present, 333 Survey of Spanish American Literature: 1700-Present and completion of an additional 9 hours of upper division Spanish. May be repeated. Maximum 6 hrs with consent of department. (Same as Linguistics 431.)

433 Images of Woman in Hispanic Literature (3) Major Hispanic texts (and/or women authors) in light of relation of female individuality to particular social context, role of women in society, patriarchal tradition, woman as cultural and as aesthetic value ("the feminine symbolic"), and feminist theoretical issues. Prereq: 323 Intermediate Composition and Grammar, 330 Textual Analysis and completion of 9 additional hours of upper division Spanish.

434 Hispanic Culture through Film (3) Analysis of selected films on subjects concerning life, culture, and artistic traditions in the Hispanic world; exploration of ideological, philosophical, social, and political implications of films and comparison of them with treatments of related subjects in other types of artistic production. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-Present, and completion of 9 additional hours of upper division Spanish. Taught in Spanish. May be repeated. Maximum 6 hrs with consent of department. (Same as Cinema Studies 434.)

461 Special Topics (3) Aspects of Hispanic literature, culture, linguistics, or foreign language pedagogy. Topics vary. May be repeated with consent of department. Maximum 6 hrs.

465 Latin American Film and Culture (3) Latin American and Latino/a films and videos from 1900s to present as works of art and in light of political, cultural, and social contexts. Taught in English. Graduate credit available only for Latin American Studies and Cinema Studies majors. 1 hr lecture, 2 hrs screening, and 1 hr discussion. (Same as Latin American Studies 465 and Cinema Studies 465.)

479 Disenchanted Texts in Hispanic Literature (3) Texts representing trends and periods of renewal in Spain and Latin American countries. Selected topics on traditions in crisis. Content varies. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-Present, 333 Survey of Spanish American Literature: 1700-Present and completion of 9 additional hours of upper division Spanish. May be

repeated. Maximum 6 hrs with consent of department. (Same as Latin American Studies 479.)

480 Social Forces in Hispanic Literary Expression (3) Analysis of major Hispanic texts that address factors and events that influenced and/or continue to influence social and cultural evolution of Hispanic world, including literature itself. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-Present and completion of 9 additional hours of upper division Spanish. May be repeated. Maximum 6 hrs with consent of department.

482 Trends in Hispanic Thought (3) Intellectual/philosophical currents represented in literary works, selected thinkers, or movements from historical periods of Spain and Latin American countries. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-Present, and completion of 9 additional hours of upper division Spanish. May be repeated. Maximum 6 hrs with consent of department.

484 Race, Ethnicity, and Nation in Hispanic Literature (3) Close reading and analysis of literary texts that deal with issues of race and ethnicity in Hispanic world, with regard to identity and concepts of nationhood. Topics: mestizaje; conceptual distinctions between race and ethnicity in Latin America; indigenismo; afrocentrism; issues of monarchy and empire; relationship between Jews, Christians, and Moors in Spain. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-Present and completion of 9 additional hours of upper division Spanish. May be repeated. Maximum 6 hrs with consent of department.

486 Literary and Artistic Movements in the Hispanic World (3) Relationships (thematic, cultural, socio-political, aesthetic, philosophical, etc.) between specific trends in literature and other artistic media, in light of historical contexts in which those relationships emerged. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-Present and completion of 9 additional hours of upper division Spanish. May be repeated. Maximum 6 hrs with consent of department.

489 Topics in Hispanic Civilization (3) Analysis of major trends, issues and/or movements in the civilizations of Spain and Spanish America. Political, literary, and cultural perspectives dealing with topics from Middle Ages to present day. Prereq: 323 Intermediate Composition and Grammar, 332 Survey of Spanish Literature: 1700-Present and completion of 9 additional hours of upper division Spanish. May be repeated. Maximum 6 hrs with consent of department.

500 Thesis (1-15) P/NP only. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N/C only. E

512 Teaching a Foreign Language (3) Practical application of methods for teaching and evaluating basic language skills and cultural aspects through seminars, demonstrations, peer teaching, and observation of foreign language classes. Required of all M.A. and Ph.D. students holding Graduate Teaching Assistantships, except those whose previous training or experience warrants their being excused by department.

531 Old Spanish (3) Evolution of Spanish language from its origins through 15th century.

532 Medieval Spanish Literature (3) Literary works of 11th through 15th century. Application of literary theories to understanding of literature, nature and evolution of major literary genres during Spanish Middle Ages, and socio-historical contexts of medieval works. May be repeated. Maximum 6 hrs with consent of department.

533 Golden Age Prose (3) Wide range of prose fiction in Spain during 16th and 17th centuries: Moorish, picaresque, sentimental, pastoral and exemplary novels, and dialogues.

534 Don Quijote (3) Cervantes' masterpiece in socio-cultural and literary context of its times: study of thematic, structural, and stylistic issues: crisis of aristocracy, Quixotic "madness," discrepant cognitive and ethical perspectives, satiric irony, culture of

sentiment, and Cervantes' legacy to subsequent literary periods. Content varies. May be repeated. Maximum 6 hrs with consent of department.

535 Golden Age Poetry (3) Garcilaso, Fray Luis de León, San Juan de la Cruz, Lope de Vega, Quevedo, and Góngora.

537 Golden Age Drama (3) Major dramatists of period: Lope de Vega, Tirso de Molina, Ruiz de Alarcón, Guillén de Castro, Calderón de la Barca, Moreto, and Rojas Zorrilla.

540 Spanish Romanticism (3) Major dramatists and poets representative of Romantic movement in Spain studied in historical perspective of 18th and 19th centuries: Feijoo, Cadalso, Duque de Rivas, Larra, Espronceda, Zorrilla, Hartzenbusch, Bécquer, Rosalía de Castro. Content varies. May be repeated. Maximum 6 hrs with consent of department.

541 19th-Century Spanish Prose (3) *Costumbrismo*, realism, and naturalism in the novel, short story, and essay as represented in major authors: Larra, Mesonero Romanos, Fernán Caballero, Alarcón, Valera, Palacio Valdés, Pereda, Galdós, Pardo Bazán. Content varies. May be repeated. Maximum 6 hrs with consent of department.

542 20th-Century Spanish Literature: Generation of '98 through Civil War (3) Principal achievements and representative directions in literature of Spain through Civil War years.

543 20th-Century Spanish Literature: Post-Civil War through Present (3) Principal achievements and representative directions in literature of Spain from Post-Civil War period to present.

550 Techniques of Literary Analysis and Research Methods (3) Theoretical and critical essays on various techniques of literary analysis. Exploration of bibliographical and research materials.

551 Special Topics in Spanish or Spanish American Literature (3) May be repeated. Maximum 6 hrs.

552 Directed Readings (3)

561 Spanish American Colonial Literature (3) From pre-Columbian era through 18th century. Reading and analysis of selected works from Colonial Spanish American period and their Continental sources. Indigenous texts and authors. Content varies. May be repeated. Maximum 6 hrs with consent of department.

562 Nineteenth Century Spanish American Literature and Nation Building (3) Analysis of Spanish American foundational texts in light of independence and construction of concepts of national identity. Content varies. May be repeated. Maximum 6 hrs with consent of department.

571 Spanish American Narrative: Criollismo to 1950 (3) Critical study of major trends and movements that shaped Spanish American narrative during first half of 20th century. Content varies. May be repeated. Maximum 6 hrs with consent of department.

572 Spanish American Narrative: Boom to Present (3) Critical study of major trends and movements that established Spanish American narrative as influential force in world literature during second half of 20th century. Content varies. May be repeated. Maximum 6 hrs with consent of department.

573 Regional Approaches to Interpreting Spanish American Literature (3) Interpretation of Spanish-American literature taking into consideration regional differences attributable to such factors as race, geography, immigration, and economic development. Key regions include Mexico and Central America, Caribbean, Andean countries, and the Southern Cone. Course readings vary between specific regional perspective and transregional one. Content varies. May be repeated. Maximum 6 hrs with consent of department.

575 Spanish American Modernismo and Vanguardismo (3) Critical study of principal writers and literary works associated with Spanish American *modernismo* and *vanguardismo* published between 1880 and 1950. Concepts and expressions of modernity as reflected in literature of period. Content varies. May be repeated. Maximum 6 hrs with consent of department.

576 Contemporary Spanish American Poetry (3) Critical study of major poets in Spanish America from

1950 to present. Content varies. May be repeated. Maximum 6 hrs with consent of department.

577 Contemporary Spanish American Theater (3) Reading and analysis of Spanish America's major dramatic works published and performed since 1950. Content varies. May be repeated. Maximum 6 hrs with consent of department.

578 Cultural and Historical Perspectives: Spanish American Essay (3) Analysis of principal cultural and historical themes making Spanish American essay key expression of individual, national, and continental identity. Emphasis on 20th-century texts. Content varies. May be repeated. Maximum 6 hrs with consent of department.

579 Spanish American Literary Criticism (3) Major works in which Spanish Americans have developed strategies to define, organize, and catalog literature published throughout continent. Critical approaches that surpass European and other non-Spanish American critical perspectives. Content varies. May be repeated. Maximum 6 hrs with consent of department.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences. Letter grade or S/NC.

600 Doctoral Research and Dissertation (3-15) P/ NP only. E

621 Seminar in Spanish Literature (3) Topics vary in field of Peninsular literature. May be repeated with consent of department. Maximum 9 hrs.

631 Seminar in Spanish American Literature (3) Topics vary. May be repeated with consent of department. Maximum 9 hrs.

Music

(College of Arts and Sciences)

MAJOR	DEGREES
Music	M.M.

Roger L. Stephens, *Director*

Professors:

Bitzas, George C., M.M.	Converse
Brock, John P., M.M.	Alabama
Coker, J., M.A.	Sam Houston
Combs, F. M., M.A.	Missouri
Jacobs, K. A., D.M.A.	Texas
MacMorran, W. S., M.M.	Wisconsin
McClelland, D. K., M.A.	Columbia
Moore, M. C., Ph.D.	Michigan
Northington, D. B., D.M.A.	Yale
Pederson, D. M., Ph.D.	Iowa
Sousa, G., Ph.D.	Ohio State
Stephens, Roger L., M.M.	East Carolina
Stutzenberger, D. R., D.M.A.	Maryland

Associate Professors:

Adams, Fay, M.M.	Tennessee
Batey, A. L., D.M.A.	South Carolina
Binder, S. L., D.M.	Florida State
Boling, M. E., M.M.	Tennessee
Brown, Donald R., Hs.D.	
Brunell, D. E., D.M.	Indiana
Carter, P. Z., M.M.	Colorado
Davis, Dolly C., Ph.D.	Iowa
Freeman, Carroll, M.P.A.	Oklahoma City
Gay, Jr., L. C., Ph.D.	Columbia
Hough, Don, M.M.	Tennessee
Leach, C. F., D.M.	Northwestern

Murphy, B. A., Ph.D.	Ohio State
Royce, David, Ph.D.	Kent State
Searle, S. R., M.M.	Tennessee
Smith, C., B.M.	SUNY-Fredonia
Sperl, G. R., M.M.	Indiana
Zelmanovich, Matus, M.A.	Lvov

Assistant Professors:

Baldwin, Wesley, D.M.A.	Maryland
Haar, Paul, M.M.	Kansas
Hawthorne, W., Ph.D.	Cincinnati
Keathley, Elizabeth, Ph.D.	SUNY (Stony Brook)
Powell, Edward, M.M.	Cincinnati
Richter, Jorge, M.M.	Andrews
Ryder, Donald, D.M.A.	Iowa
Walters, Christy, D.M.	Florida State
Wentzel, A. N., M.M.	Southern Cal

The School of Music offers the Master of Music degree with concentrations in accompanying, choral conducting, composition, instrumental conducting, jazz, music education, music theory (with an optional emphasis in music technology), musicology, performance (organ, piano, strings, voice, winds, and percussion), and piano pedagogy and literature.

Applicants must have completed an undergraduate degree that is approximately equivalent in music requirements to degrees conferred by UT, with a major appropriate to the applicant's prospective area of concentration on the master's level.

Applicants who plan to pursue the concentration in performance or music education are required to audition for the appropriate area faculty. Applicants for admission to the program in composition must submit scores and tape recordings of representative works. Applicants for the concentration in jazz must audition in jazz improvisation and jazz piano proficiency and interview with members of the faculty in this area. Other applicants are required to have an interview with members of the faculty of the prospective area of concentration.

All entering master's degree students are required to take Diagnostic Examinations in music theory, ear-training, and music history/literature. These examinations are given by the School of Music at the beginning of each semester.

THE MASTER'S PROGRAM

A minimum of 33 semester hours of coursework is required for the Master of Music degree. These hours are specifically distributed according to the area of concentration. All concentrations require coursework in music bibliography, music history/literature and music theory and allow for elective courses. Specific curricula are available from the department. All concentrations require a written and oral final examination.

A thesis is required of students in composition, musicology, and music theory. A graduate recital or performance project is given in lieu of thesis by students with concentrations in performance, pedagogy, jazz, accompanying, choral conducting, and instrumental conducting.

The concentration in music education is designed for persons who hold a Bachelor's

degree in Music or Music Education and certification to teach music in the public schools. Both thesis and non-thesis options are available.

Music Education

GRADUATE COURSES

510 Foundations of Music Education (3) Historical, philosophical and aesthetic bases. Prereq: Consent of instructor.

520 Research in Music Education (3) Definition of research problems, data collection and analysis, and research report writing. Application of knowledge of research techniques to analysis of existing research literature in music education. Prereq: Consent of instructor.

550 Curriculum Development and Evaluation in Music Education (3) Principles of curriculum development applied to music education programs. Formulating objectives; construction of evaluation instruments, survey of appropriate literature. Prereq: Consent of instructor.

560 Advanced Studies in General Music (3) Current trends, methodologies, and strategies appropriate for general music classroom. Study of Dalcroze, Orff, Kodaly, cooperative learning, critical thinking. Practical application for teaching students K-8.

570 Studies in Multicultural Music Education (3) Study of music literature, art and customs of various cultures appropriate for students in K-8. Strategies and techniques for teaching music at this level.

571 Musical Repertoire Laboratory (1) Performance of music from various cultures: production of musicals appropriate for students in grades K-8. Singing, dancing, acting, costumes, set design, traditional and non-traditional instrumental ensembles. Limited to students majoring or concentrating in art, dance or theatre. Prereq or coreq: 570. May be repeated. Maximum 2 hrs.

574 Analysis for Teaching for Professional Development (2) Strategies to document and analyze effectiveness of teaching and professional development. Study and application of various approaches. Coreq: 575. F, Sp.

575 Professional Internship in Teaching (1-8) Teaching and teaching-related experiences in professional settings in public schools. Enrollment limited to post-baccalaureate students in professional year program. Prereq: Admission to Teacher Education program and consent of School of Music. May be repeated. Maximum 12 hrs. S/NC only. F, Sp.

580 Seminar in Music Education (3) Class investigation and individual reporting of pertinent topics and issues in music education. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

590 Special Topics in Music Education (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

591 Clinical Studies (4) Group and individual seminar activities during full-time internship. Application and evaluation of professional core competencies. Completion and presentation of portfolio and analysis of teaching project. Coreq: 575.

593 Special Problems in Music Education (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

Music Ensemble

GRADUATE COURSES

Prerequisite: By audition or consent of instructor.

502 Jazz-Saxophone Ensemble (1) May be repeated. Maximum 4 hrs.

503 Small Jazz Ensemble (1) May be repeated. Maximum 12 hrs.

504 Jazz Ensemble (1) May be repeated.

505 Studio Orchestra (1) May be repeated. Maximum 12 hrs.

506 Trombone Choir (1) May be repeated.

510 Percussion Ensemble (1) May be repeated.

511 Marimba Choir (1) May be repeated.

515 Chamber Music Ensemble (1) May be repeated. Maximum 12 hrs.

520 UT Singers (1) May be repeated.

530 Chamber Singers (1) May be repeated.

540 Opera Theatre (1) May be repeated.

550 Concert Band (1) May be repeated.

552 Symphonic Band (1) May be repeated. Maximum 12 hrs.

553 Wind Ensemble (1) May be repeated. Maximum 12 hrs.

554 Varsity Band (1) May be repeated.

559 Marching Band (1) May be repeated.

570 Symphony Orchestra (1) May be repeated.

580 Concert Choir (1) May be repeated.

589 Women's Chorale (1) May be repeated.

599 Accompanying (1) May be repeated.

Music General

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E

501 Graduate Recital (2) E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

510 Music Bibliography (3) Bibliographic methodology in music. F

511 Lecture Recital (2) E

520 Musical Styles (3) Elements of design and their role in definition of musical styles. Prereq: Consent of instructor.

521 Special Topics in Performance (1-3) Prereq: Consent of department head. E

540 Secondary Applied Music (1) May be taken by music majors desiring applied study on a 2nd or 3rd instrument. May be repeated for a maximum of 4 hours credit on each instrument. Admission by audition. Requires payment of Applied Music fee. E

Music History

GRADUATE COURSES

410 Music History Genre (3) Topics vary. May be repeated. Maximum 6 hrs.

420 History of Opera (3) Dramatic, vocal, and orchestral elements in opera of Italian, French, and German schools, 1600-present.

430 Symphonic Literature (3) Literature for orchestra from Baroque to present, evolution of symphony.

450 Composer Seminar (3) Life and works of single composer. Subjects vary.

460 Music Aesthetics (3) Nature of music and musical experience, sense perception and emotions, music, and role of artist in society. Aesthetic viewpoint of

individuals and historical eras through selected writings.

480 Music in Christian Worship (3) Hymnody, liturgies, and liturgical music.

540 Music in the Renaissance (3) From 1400 to 1600. Mass, motet, chansons, madrigal, and other vocal and instrumental forms and genres.

550 Music in the Baroque Period (3) From c.1600 to 1750; rise of opera and oratorio, sacred and secular cantatas, instrumental forms, performance practice.

560 Music in the Classic Period (3) Evolution of classical style from pre-classic music to music of Haydn, Mozart, and early Beethoven.

570 Music in the Romantic Period (3) Nineteenth-century musical styles from Beethoven to post-romanticists.

580 Music in the Twentieth Century (3) From 1890, Debussy, to present, Stockhausen and others.

585 Topics in Music of the Americas (3) Topics vary.

590 Introduction to Ethnomusicology (3) Ethnomusicology as scholarly discipline. History, theories, and methodologies as applied to study of music in culture. Prereq: Music in World Culture or equivalent.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of department head.

595 Seminar in Ethnomusicology (3) Topics vary. Prereq: 590 and consent of instructor.

Music Instrumental

GRADUATE COURSES

490 Instrumental Conducting (3) Development of knowledge and skills in instrumental conducting; study of various periods and composers and relationship of different styles to conductor's art; musical analysis and practice in conducting. Prereq: Music Education 320 or equivalent.

580 Band History and Literature I (3) Antiquity to 1900.

581 Band History and Literature II (3) 1900 to present.

583 Recitative for Instrumental Conductors (1) Problems in conducting recitatives. Prereq: Consent of instructor. S/NC only.

584 Practicum for Instrumental Conductors (1) Intern experience in field other than area of major interest. S/NC only.

590 Advanced Instrumental Conducting (2) Physical techniques of conducting, study and analysis of scores, rehearsal techniques. Attention to individual problems. Requires applied music fee. Prereq: Consent of instructor. May be repeated. Maximum 8 hrs.

595 Instrumental Conducting Performance (1) Preparation and juried performance of band or orchestral work(s). Prereq: Consent of instructor.

Music Jazz

GRADUATE COURSES

410 Advanced Improvisation (3) Further development of individual skills and solving individual problems in jazz improvisation. Prereq: 210 and 220.

420 Jazz Pedagogy (1) Methods and materials relating to teaching of jazz, designing and administering jazz programs, and rehearsal techniques for jazz ensembles. Prereq: Studio music and jazz major or consent of instructor.

520 Seminar in Jazz (3) Topic varies.

Music Keyboard

GRADUATE COURSES

420-30 Piano Literature I,II (3,3) 420--From 1750 to middle 19th century; 430--Middle 19th century to present.

460-70 The Organ and Its Literature I,II (3,3) Development of organ and organ literature from Middle Ages to present; problems of style and interpretation; pedagogical literature and methods; organ design. Prereq or coreq: Music History 220 and consent of instructor.

480 Teaching Class Piano (3) Historical survey and evaluation of teaching materials and methodology for college and/or adult beginning piano classes, with collateral teaching experience. Prereq: Consent of instructor.

485-95 Suzuki Piano Method I,II (2,2) Psychology, procedures, and literature of Suzuki piano method. Must be taken in sequence. Prereq: Consent of instructor.

490-491 Internship (2,2) Opportunity for pedagogy students to gain experience in teaching beginning students under supervision of experienced instructors. Weekly discussion seminars.

520 Piano Literature Seminar (3) Topics vary. May be repeated. Maximum 6 hrs.

531-41 Recital Project (2,2) Preparation and accompaniment of full recital for accompanying concentrations only. 531--Vocal recital, 541--Instrumental recital. Prereq: Consent of instructor.

540-50 Advanced Piano Pedagogy I, II (2,2) 540--Evaluation and study of methods and materials for teaching piano at all levels. Supervised laboratory teaching. Prereq: Consent of instructor. 550--Introduction and principles of Kodaly, Orff, Suzuki, Dalcroze Eurhythmics, and class piano teaching. Prereq: Consent of instructor.

560 Organ Literature Seminar (3) Topics vary. May be repeated. Maximum 6 hrs.

Music Performance

GRADUATE COURSES

All performance courses require an audition and consent of instructor. May be repeated. Maximum 8 hrs toward M.M. degree.

403 Flute (1-4)

405 Oboe (1-4)

410 Bassoon (1-4)

415 Clarinet (1-4)

420 Saxophone (1-4)

425 Horn (1-4)

430 Trumpet (1-4)

435 Trombone (1-4)

440 Baritone (1-4)

445 Tuba (1-4)

450 Percussion (1-4)

455 Voice (1-4)

460 Violin (1-4)

465 Viola (1-4)

470 Cello (1-4)

475 String Bass (1-4)

476 Electric Bass (1-4)

479 Guitar (1-4)

480 Piano (1-4)

- 485 Harpsichord (1-4)**
490 Organ (1-4)
494 Composition (1-3)
495 Composition with Electronic Media (1-3)
499 Improvisation (1-2) May not be used toward applied music requirement.
503 Flute (1-4)
505 Oboe (1-4)
510 Bassoon (1-4)
515 Clarinet (1-4)
520 Saxophone (1-4)
525 Horn (1-4)
530 Trumpet (1-4)
535 Trombone (1-4)
540 Baritone (1-4)
545 Tuba (1-4)
550 Percussion (1-4)
551 Accompanying and Coaching (1-4)
555 Voice (1-4)
560 Violin (1-4)
565 Viola (1-4)
570 Cello (1-4)
575 String Bass (1-4)
576 Electric Bass (1-4)
579 Guitar (1-4)
580 Piano (1-4)
585 Harpsichord (1-4)
590 Organ (1-4)
594 Composition (1-3)
595 Composition with Electronic Media (1-3)
599 Improvisation (1-4)

Music Technology

GRADUATE COURSES

- 540 Computer Music Transcription (3)** Projects in notation, playback, and publication of music incorporating elements of word processing, graphic design, sequencing, and page layout. Study of MIDI protocol as applied to computer music work station design. No credit toward M.M. concentration in Music Theory with technology emphasis. Prereq: Consent of instructor.
- 550 Computer Projects (3)** High-level programming languages used to design and implement computer-managed instruction; Internet development tools; writing of documentation for computer projects. Prereq: 540 or equivalent.
- 560 Technology in Music Research (3)** Use of technology for research projects in music analysis or pedagogy: development and execution of research project. Prereq: 550.

Music Theory

GRADUATE COURSES

- 430-40 Counterpoint I,II (3,3)** 430--Study of species counterpoint in modal and tonal styles, works of Palestrina and J.S. Bach. 430 - Prereq: 210 Theory III and 230 Advanced Ear Training III with grade C or higher. 440 - Prereq: 430 with grade C or higher.
- 450 Choral Arranging (2)** Analysis of scores and writing of arrangements for choruses. Prereq: 210 Theory III and 240 Advanced Ear Training IV with grade C or higher, or consent of instructor.

520 Analytical Techniques (3) Analytical techniques, contemporary approaches. Tonal and neotonal music. Prereq: Consent of instructor.

530 Music Theory Pedagogy (3) Techniques, methods, and materials involved in college-level theory programs. Use of technology and review of existing software. Prereq: Consent of instructor.

593 Independent Study (1-15) See College of Arts and Sciences. Prereq: Consent of department head.

Music Voice

GRADUATE COURSES

410-20 Song Literature I, II (2,2) 410-German songs. 420-French, Italian, Russian, Scandinavian, Czechoslovakian, British, and American art songs. Graduate credit not available for students in vocal performance.

425 Functional Diction for Singers (3) Comprehensive survey of singing diction in six languages: English, French, German, Italian, Latin and Spanish. Basic instruction in International Phonetic Alphabet; development of basic diction skills; overview of diction styles and traditions in each language; survey of diction resources and reference materials. Does not fulfill deficiency requirements for graduate students in voice or accompanying.

490 Church Music Methods, K-12 (3) Development of child's voice through teenage years, vocal/choral techniques for various age groups through high school, choral literature for the youth church choir, non-vocal musical activities appropriate to various age groups as used in church music programs (e.g., Orff, handbells, rhythm activities, etc.)

510 Vocal Literature Seminar (3) Topics vary. May be repeated. Maximum 6 hrs.

520 Performance Techniques for Singers (1) Improvisation, movement, and basic techniques for dramatic vocal performance. Prereq: Vocal major or consent of instructor. May be repeated for credit. Maximum 2 hrs.

530 Opera Performance (2) Prereq: Consent of instructor. May be repeated. Maximum 4 hrs.

540 Opera Production (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

550-60 Advanced Vocal Pedagogy I,II (2,2) 550--Study of vocal production, examination of different methods. 560--Study of teaching materials, observation of studio teaching, analysis of vocal problems in selected students, and supervised teaching.

570 Vocal Chamber Music Performance (2) Prereq: Consent of instructor.

580-85 Choral Literature I,II (2,2) Choral music from middle ages to present with consideration of historical development of major choral genres.

590 Advanced Choral Conducting (3) Expansions and continued refinement of conducting technique; development of choral rehearsal skills. Prereq: Consent of instructor.

594 Project in Choral Conducting Performance (1-3) Public performance, critical document; recording project. Prereq: Consent of instructor. May be repeated.

595 Choral Conducting Seminar (3) Score reading and preparation; problems of interpretation, performance practices, and conducting techniques. Prereq: 590 or consent of instructor. May be repeated.

Nuclear Engineering

(College of Engineering)

MAJOR

Nuclear Engineering M.S., Ph.D.

DEGREES

H. L. Dodds, *Head*

Professors:

Dodds, H. L., PE, Ph.D. Tennessee
 Kerlin, T. W. (Emeritus), Ph.D. Tennessee
 Miller, L. F., PE, Ph.D. Texas A&M
 Perez, R. B. (Emeritus), Ph.D. Madrid
 Stevens, P. N. (Emeritus), PE,
 Ph.D. Northwestern
 Townsend, L. W., Ph.D. Idaho
 Uhrig, R. E. (Distinguished Prof.), PE,
 Ph.D. Iowa State
 Upadhyaya, B. R., PE, Ph.D. California

Associate Professors:

Groer, P. G., Ph.D. Vienna
 Hines, J. W., Ph.D. Ohio State
 Pevey, R. E., PE, Ph.D. Tennessee
 Ruggles, A. E., Ph.D. Rensselaer
 Scott, T. H., PE, Ph.D. Florida

Research Professors:

Mihalcz, J. T., Ph.D. Tennessee
 Mynatt, F. R., Ph.D. Tennessee
 Shannon, T. E., Ph.D. Tennessee

Research Assistant Professors:

Gribok, Adrei, Ph.D. IPPE (Russia)

The Department of Nuclear Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees. Students may elect a traditional nuclear engineering program focusing on fission energy or fusion energy, or a radiological engineering concentration, which prepares students for careers in the radiation safety field (health physics). Both programs are designed for graduates of accredited undergraduate programs in engineering, physics, chemistry, biology, or mathematics.

All entering students must have, as a minimum, competency in mathematics through ordinary differential equations, competency in atomic and nuclear physics, and competency consistent with an introductory course in nuclear engineering. If such competencies do not exist, the student must take appropriate courses for undergraduate credit. In addition, students without a B.S. degree in nuclear engineering, or the equivalent, must take 431 (Radiation Protection) and 470 (Nuclear Reactor Theory I), both of which may be taken for graduate credit. The department head is the contact for all interested students, both those with nuclear engineering degrees and those from other disciplines. More detailed information about the Department of Nuclear Engineering is available on the web at <http://www.engr.utk.edu/nuclear/>.

THE MASTER'S PROGRAM

A graduate program leading to the Master of Science degree is available to graduates of recognized undergraduate curricula as described above. Each applicant will be advised as to the necessary prerequisite courses before he/she enters the program.

The minimum requirements for the M.S. degree in nuclear engineering are:

1. A major consisting of 12 semester hours of graduate courses in nuclear engineering which must include at least one

of the following sequences: 511, 512; 521, 522; 551, 552; 571, 572; 581, 582.

2. A minor consisting of 6 semester hours of elective courses in mathematics, statistics or computer science.

3. Six semester hours in either nuclear engineering or a related field.

4. One of the following three options for a culminating experience:

a. A thesis project (6 hours of 500).

b. Two to four engineering practice projects (6 hours of 598).

c. One engineering practice project (3 hours of 598) plus 6 hours of additional nuclear engineering coursework.

Thus, options (a) and (b) result in a minimum total of 30 hours and option (c) results in a minimum total of 33 hours. The determination of which option a student may undertake is made by the student's graduate committee and is based on the student's personal interests, academic background, and work experience, as well as the nature of projects currently available in the department.

A thesis project requires the student to conduct independent, in-depth research. An engineering practice project is similar to a thesis project but smaller in scope, and can be research, design, product development, special operations, or a critical review of published literature in a specific technical area. The student must submit a brief written proposal for each project undertaken, either thesis or engineering practice, which must be approved by the student's graduate committee. The final report for an engineering practice project is normally prepared in thesis format (i.e., according to the *UT Knoxville Guide to the Preparation of Theses and Dissertations*); however, another formal report format may be used if approved by the student's graduate committee. The student must also register for the appropriate number of hours of either 500 or 598, as specified by the student's major professor, during each semester that work is performed on a thesis or engineering practice project. Finally, the student must pass an oral examination on all work presented for the degree—all coursework and all projects.

The M.S. degree in nuclear engineering program is also available to distance students via selected courses that are delivered synchronously over the web to the student's computer. More detailed information about this distance program is located at <http://www.anywhere.tennessee.edu/ne/default.htm>.

THE DOCTORAL PROGRAM

Students in the field of nuclear engineering desiring to study for the Doctor of Philosophy degree must have a Bachelor of Science or Master of Science from a recognized university with a major in engineering, physics, chemistry, biology, or mathematics. All candidates will be required to demonstrate general competence in a comprehensive examination in the areas of engineering science, mathematics, chemistry, physics, and nuclear engineering.

Specific requirements for the Ph.D. in nuclear engineering include:

1. A minimum of 48 semester hours beyond the bachelor's degree, exclusive of

credit for the M.S. thesis or nuclear engineering practice.

2. A minimum of 24 semester hours in doctoral research, Nuclear Engineering 600.

3. A minimum of 30 semester hours in nuclear engineering courses numbered 500 and above (or the equivalent), with at least 9 semester hours of 600-level courses. These are exclusive of thesis or dissertation credit.

4. A minimum of 12 semester hours in mathematics, computer science, or statistics courses beyond nuclear engineering undergraduate requirements numbered 400 or above.

5. A minimum of 6 semester hours in courses numbered 500 or above from a department other than nuclear engineering. The choice depends on the student's overall program and should expand his/her knowledge in a given field.

The first part of the comprehensive examination is prepared by the nuclear engineering faculty and consists of 12 hours of written examination that is administered over a three-day period. All past written examinations are filed in the library, and students are encouraged to review them. Students are invited to take the written examination after completing approximately 30 semester hours of graduate coursework. A student who fails the written examination must take and pass the examination the next time it is offered to remain in the Ph.D. program. Registration for 600 is not permitted until the written examination is passed. The second part of the comprehensive examination is completed with the successful oral defense of a written dissertation proposal.

A candidate must successfully defend, in an oral examination, all work presented for the degree—all coursework and the dissertation.

CERTIFICATE IN MAINTENANCE AND RELIABILITY ENGINEERING

The College of Engineering offers a certificate program in maintenance and reliability engineering. The program is designed primarily for part-time students in that all of the courses are available through distance education (see <http://www.anywhere.tennessee.edu/ne/default.htm>).

The 12-credit certificate is earned by completing 483 and 484, which are cross-listed among all participating departments in the College of Engineering, plus two elective courses selected from a list of courses provided by the participating departments. Currently, the available elective courses are Industrial Engineering 516 and 591, Mechanical Engineering 534 and 599, and Nuclear Engineering 579 and 585. The selection of elective courses is determined through an advising conference with each individual student, and is based on the student's personal interests, academic background, and work experience. Applicants must meet the minimum criteria established by the Graduate Council.

CERTIFICATE IN NUCLEAR CRITICALITY SAFETY

The Department of Nuclear Engineering offers a certificate program in nuclear criticality safety. The program is designed

primarily for part-time students in that all of the courses are available through distance education (see <http://www.anywhere.tennessee.edu/ne/default.htm>).

The 12-credit certificate is earned by completing 421, 543, and 582 plus one of the following three courses: 470, 571, or 581. The selection of one of the latter three courses is determined through an advising conference with each individual student, and is based on the student's personal interests, academic background, and work experience. Applicants must meet the minimum criteria established by the Graduate Council. Students without a nuclear engineering background must take 301 (Fundamentals of Nuclear and Radiological Engineering) prior to beginning the graduate coursework described above.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.S. program in Nuclear Engineering is available to residents of the states of Arkansas, Mississippi, or South Carolina. Additional information may be obtained from the Administrative Services Assistant in the Office of Graduate Admissions.

GRADUATE CREDIT FOR UNDERGRADUATE COURSES

400-level courses in nuclear engineering may be used for graduate credit. However, at least two-thirds of the minimum required hours in the M.S. program must be taken in courses numbered 500 or above.

GRADUATE COURSES

403 Nuclear and Radiological Engineering Laboratory II (3) Cross section measurements, diffusion properties of neutrons, shielding, dynamics and controls, alpha and beta spectroscopy, radiation fields and dosimetry. Prereq: Nuclear and Radiological Engineering Laboratory I.

404 Nuclear Fuel Cycle (3) Mining, milling, fabrication, in-core management, reprocessing, waste disposal, regulatory and radiation health issues and requirements. Prereq: 470 or equivalent.

406 Radiation Shielding (3) Types of radiation sources, fundamentals of gamma ray and neutron attenuation, biological effects, approximate methods of shield design, discrete ordinates, and Monte Carlo. Prereq: Physics 232.

421 Introduction to Nuclear Criticality Safety (3) Fundamentals of nuclear criticality safety; criticality accidents; safety standards; overview of experiments, computational methods, and applications. Prereq: 301 Fundamentals of Nuclear/Radiological Engineering.

431 Radiation Protection (3) External and internal dosimetry, biological effects of radiation, radiation detection, radiation risk assessment. Prereq: 301 Fundamentals of Nuclear/Radiological Engineering.

432 Radiation Risk Analysis (3) Radiation risk estimates for external and internal radiation, dose-response models, dose rate effects, prediction of radiation risks, radiation safety standards.

470 Nuclear Reactor Theory I (3) Fundamentals of reactor physics relative to cross sections, kinematics of elastic scattering, reactor kinetics, reactor systems and nuclear data. Analytical and numerical methods applicable to general criticality problems, eigenvalue searches, perturbation theory, and multigroup diffusion equations. Prereq: 301 Fundamentals of Nuclear/Radiological Engineering.

471 Nuclear Reactor Theory II (3) Thermal spectrum computational methods; heterogeneous effects in fast and thermal spectra; considerations in reactor core design; equations that relate thermal and neutronic variables; power distribution calculations and reactivity control methods. Prereq: 470.

483 Introduction to Reliability Engineering (3) Probabilistic failure models, parameter estimation (maximum likelihood, Bayes techniques), model identification and comparison, accelerated life tests, failure prediction, system reliability, preventive maintenance and warranties. Prereq: Senior standing or consent of instructor. (Same as Chemical Engineering 483, Industrial Engineering 483, and Mechanical Engineering 483.)

484 Introduction to Maintenance Engineering (3) Principles of maintenance and reliability engineering, and maintenance management. Information extraction from machinery measurements, rotating machinery diagnostics, nondestructive testing, life prediction, failure models, lubrication oil analysis, establishing predictive maintenance program, and computerized maintenance management systems. Prereq: Senior standing in engineering and consent of instructor. (Same as Chemical Engineering 484, Industrial Engineering 484, Materials Science and Engineering 484, and Mechanical Engineering 484.)

494 Special Topics in Nuclear Engineering (3) Problems related to recent developments and practice. Prereq: Senior standing and consent of instructor. May be repeated. Maximum 6 hrs.

500 Thesis (1-15) P/NP only. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

511-12 Transport Processes in Nuclear Engineering (3,3) Rheology of newtonian and non-newtonian fluids; integral and system conservation equations for single and multi-component fluids; in-depth development of differential conservation equations for mass, energy, and momentum; exact and approximate solutions of equations of motion; boundary layer analysis; numerical analysis of fluid flow and heat transfer.

521 Nuclear Systems Dynamics and Control (3) Introduction to state variable methods for system dynamics and control analysis and application of these methods to nuclear plant dynamics, simulation and control problems.

522 Experimental Methods in Reactor Dynamics (3) Introduction to time domain and frequency domain techniques. Measurement, analysis, and interpretation of process signals for reactor surveillance and diagnostics. Introduction to time-series modeling. Prereq: 521.

541 Reactor Fuel Management (3) Topics relative to in-core fuel management. Applicable topics in reactor physics, fuel depletion, isotopic inventories, reactivity control and numerical methods. Prereq: 470 or consent of instructor.

542 Management of Radioactive Materials (3) Technology for processing, treatment, handling and storage of radioactive nuclides. Analytical and numerical methods for evaluating environmental impact of radioactive materials. Licensing and regulation issues.

543 Selected Topics in Nuclear Criticality Safety (3) Criticality safety computational and experimental methods for enrichment, fabrication, storage, reprocessing, and transport applications; overview of safety practices and regulatory requirements. Prereq: 421 or consent of instructor.

550 Radiation Measurements Laboratory (3) Physics and electronics associated with radiation detection and measurement, methods of data analysis. Applicability of particular detector measurements and fundamentals of radiation detection instrumentation operation. Prereq: 551.

551 Radiation Protection (3) Fundamental concepts and definitions used in radiation protection. Interactions of photons, neutrons and heavy charged particles with matter and mechanisms of energy loss. Chemical and biological effects of radiation. Introduction to

current radiation protection standards and regulations. Coreq: 301 Fundamentals of Nuclear/Radiological Engineering.

552 Radiological Assessment and Dosimetry (3) Transport of radionuclides in environment, food chain pathways, internal dosimetry and personnel dosimetry. Prereq: 551 or consent of instructor.

553 Radiation Risk Analysis (3) Methods for radiation risk prediction, survival analysis, parameter estimation, real data analysis, extrapolation techniques. Prereq: 552 or consent of instructor.

567 Radiation Therapy I (3) Ionizing radiation use in radiation therapy to cause controlled biological effects in cancer patients. Physics of interaction of various radiation modalities with body equivalent materials and physical aspects of clinical applications. Lecture and lab. Prereq: Consent of instructor.

568 Radiation Therapy II (3) Physics of ionizing radiation therapy with emphasis on quality assurance, treatment planning, radiation protection, and special treatment procedures. Lecture and lab. Prereq: 567.

571 Reactor Theory and Design (3) Analytical and numerical techniques for neutronics modeling of nuclear systems. Forward and adjoint Boltzmann transport equation. Multigroup diffusion theory. Core analysis methods and codes. Prereq: 470 or consent of instructor.

572 Nuclear System Design (3) Design and analysis of a nuclear system, interface with non-nuclear aspects of system design: system reliability and economics; class project. Prereq: Consent of instructor.

576 Expert Systems in Engineering (3) Application of expert systems in engineering: logic and rationale, developing expert systems, programming, advanced topics. Prereq: 575 or consent of instructor. (Same as Mechanical Engineering 576 and Engineering Science 576.)

577 Neural Networks in Engineering (3) Neural network technology for use in intelligent systems; rationale for neural computing, structure of neural computing systems, programming. Prereq: Consent of instructor. (Same as Mechanical Engineering 577 and Engineering Science 577.)

578 Fuzzy Systems in Engineering (3) Fuzzy numbers, fuzzy environment, uncertainty and randomness, approximate reasoning, fuzzy models and structures, decision process in fuzzy environment, fuzzy computing, fuzzy logic controllers, fuzzy expert systems and other engineering applications. (Same as Engineering Science 578.)

579 Advanced Monitoring and Diagnostic Techniques (3) Fundamentals of machinery monitoring and diagnosis and application of advanced statistical and artificial intelligence based techniques such as ridge regression, principal component analysis (PCA), linear and non-linear partial least squares (PLS), neural networks, and fuzzy logic. Prereq: Graduate standing or consent of instructor.

581 Reactor Shielding (3) Application of analytic/deterministic solutions of Boltzmann transport equation to shield design problems. Spherical harmonics, moments method, discrete ordinates, adjoint calculations, coupled analysis, and fast reactor shield design. Prereq: 406 or equivalent.

582 Monte Carlo Analysis (3) Analysis of radiation transport problems in radiation shielding by Monte Carlo method, use of MCNP code system. Random sampling, evaluation of integrals, analog particle transport, techniques of variance reduction, forward and adjoint modes of analysis, importance function biasing, splitting/weight window survival biasing and contribution theory. Prereq: Consent of instructor.

585 Process System Reliability and Safety (3) Qualitative and quantitative techniques for assessing and improving process systems reliability and safety. Fault tree analysis and associated dependent failure analysis. Prereq: Consent of instructor. (Same as Chemical Engineering 585.)

597 Special Topics in Nuclear Engineering (3) Lectures and recitation on recent advances in nuclear engineering. Prereq: Consent of instructor. May be repeated with consent of department.

598 Nuclear Engineering Practice (3-9) Experience in solving and reporting on engineering problems. Prereq: Approval of department. May be repeated. Enrollment limited to alternative plan students. S/NC only.

600 Doctoral Research and Dissertation (3-15) P/NP only. E

611-12 Selected Topics in Reactor Theory (3,3) Transport theory, control rod theory, stochastic methods. Selected topics from literature. Prereq: 572.

621 Selected Topics in Radiation Protection (3) Prereq: 551, 552. May be repeated with consent of department.

653 Theory of Information Processing (3) Modern system theoretical methods for evaluating system performance from dynamic measurements. Prereq: 522 or equivalent.

671 Advanced Topics in Applied Artificial Intelligence (3) Recent advances in engineering applications of artificial intelligence. Prereq: 577. (Same as Mechanical Engineering 671 and Engineering Science 671.)

697 Special Topics in Nuclear Engineering (3) Investigation of new developments. Prereq: Consent of instructor.

Nursing

(College of Nursing)

MAJOR DEGREE
Nursing M.S.N., Ph.D.

Joan L. Creasia, *Dean*
Sandra McGuire, *Director of M.S.N. Program*
Sandra Thomas, *Director of Ph.D. Program*

Professors:

Alligood, Martha R., Ph.D. New York
Creasia, Joan L., Ph.D. Maryland
Droppleman, Patricia G., Ph.D. Tennessee
Farr, Glen, Pharm.D. Tennessee
Groer, Maureen, Ph.D. Illinois
Mozingo, Johnie N., Ph.D. Walden
Seavor, Carol, Ed.D. Massachusetts
Thomas, Sandra P., Ph.D. Tennessee

Associate Professors:

Davis, Mitzi, Ph.D. Tennessee
Hall, Joanne, Ph.D. San Francisco
McGuire, Sandra, Ed.D. Tennessee
Speraw, Susan, Ph.D. California

Assistant Professors:

Bell, Donald, M.S.N. Tennessee
Brown, Allie J., M.S.N. Alabama (Birmingham)
Brown, Mary Lynn, Ph.D. Tennessee
Chen, Shu-li, Ph.D. Utah
DuMont, Phyllis, Ph.D. Tennessee
Dyess, Rachelle, M.S.N. Tennessee
Evans, Ginger W., M.S.N. Tennessee
Gaylord, Nan, Ph.D. Tennessee
Gunther, Mary, Ph.D. Tennessee
Helton, Sally M., M.S.N. Texas Women's
Kollar, Mary, Ph.D. Tennessee
Mefford, Linda, Ph.D. Tennessee
Nalle, Maureen, Ph.D. Tennessee
Pierce, Margaret, M.S.N. Tennessee
Powell, Jill, Ph.D. Wisconsin
Preston, John, M.S.N. Tennessee
Robinson, Carolyn, Ph.D. Tennessee
Witucki, Janet, Ph.D. Tennessee

THE MASTER'S PROGRAM

The College of Nursing offers the Master of Science in Nursing degree with concentrations in adult health nursing, family nurse practitioner, mental health nursing, nurse anesthesia, nursing administration, and nursing of women and children. The program is accredited by the National League for Nursing Accrediting Commission and is unconditionally approved by the Tennessee Board of Nursing.

The purpose of the Master's program in nursing is to prepare leaders, managers, and practitioners who facilitate achievement of optimal health in the dynamic health care system. The program prepares advanced practice nurses for a career in adult health nursing, nursing of women and children, mental health nursing, and nurse anesthesia as well as role preparation as nurse practitioners, clinical nurse specialists or nursing administrators. Advanced practice nursing involves the delivery of care, management of resources, interdisciplinary collaboration, and application of technology, information systems, knowledge, and critical thinking.

Admission Requirements

1. Meet requirements for admission to graduate study.
2. Achieve a score of 500 or above on the verbal and on the quantitative portions of the Graduate Record Examination.
3. Achieve a TOEFL score of 550 or above if native language is not English.
4. Applicants for nurse anesthesia require an interview.
5. Hold a Bachelor's degree in Nursing (BSN) from an accredited program.
 - a. Hold or be eligible for licensure to practice nursing in Tennessee.
 - b. Have an undergraduate GPA of 3.0 or higher on a 4-point scale, or a GPA of 3.3 for courses in the undergraduate major.
 - c. Have completed a health assessment and physiology course within the past five years.
 - d. Have completed 3 hours of graduate level statistics.
 OR
 Hold a bachelor's degree in a discipline other than nursing (master's entry student or RN) from an accredited college or university.
 - a. Have a cumulative undergraduate GPA of at least 3.0 on a 4-point scale.
 - b. Have satisfactorily completed the following prerequisite courses: chemistry (8 hrs); microbiology (including lab); anatomy and physiology (6-8 hrs); nutrition (covering lifespan in health and illness); behavioral sciences (12 hrs in sociology, anthropology, growth and development, and at least one general psychology course); undergraduate research course or equivalent; 3 hours of graduate level statistics prior to enrollment in graduate research course.
 - c. This option not available to nurse anesthesia or nurse administration students.
6. New students normally are admitted to the program only at the beginning of fall semester. However, under special circumstances and on a space available basis, a B.S.N. graduate may be admitted at the beginning of spring or summer terms in a

temporary non-degree status. Applications from full-time BSN and master's entry students for fall admission must be received by February 1. Part-time and post-master's applications must be received by October 1.

Special Requirements

1. Each student must hold personal professional liability insurance.
2. Registered nurses must be licensed to practice nursing in Tennessee.
3. Each student must present proof of hepatitis B vaccination and rubella and rubeola immunization or sufficient titer for immunity; TB status.
4. Each student must present evidence of current 2-person CPR certification.
5. Non-registered nurse students must have completed courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 semester hours of behavioral science courses.
6. Contact student services for more detailed information about the application process: Student Services/MSN Program, UT College of Nursing, 1200 Volunteer Blvd., Knoxville, TN 37996-4180; phone: 865 974-7606.

Thesis and Non-Thesis Options

The thesis option is available for interested students and is especially encouraged for those who are considering pursuit of doctoral degrees sometime in the future. Students who choose the non-thesis option must register for 582 Scholarly Inquiry for Advanced Practice Nursing.

Program Requirements

All students must complete a minimum of 36 semester hours distributed as follows:

Core (9 credits)

503	Health Promotion in Advanced Practice Nursing	3
510	Theoretical Foundations of Nursing	3
520	Advanced Practice Nursing and Health Delivery Systems	3

Advanced Practice Core (9 credits)*

504	Advanced Health/Physical Assessment	3
505	Advanced Clinical Pharmacology	3
515	Advanced Pathophysiology for Nursing Practice (not required for nurse anesthesia students)	3
Required for nurse anesthesia students:		
506	Advanced Anesthesia Pharmacology	3
516	Advanced Pathophysiology: Neurological and Cardiovascular with Anesthesia Implications	2
517	Advanced Pathophysiology: Respiratory/Renal with Anesthesia Implications	2
518	Advanced Pathophysiology: Obstetrics/Regional Anesthesia	2
521	Basics of Nurse Anesthesia	6
522	Integrated Health Science for Anesthesia	3
523	Advanced Principles of Nurse Anesthesia Practice	2

Research (6-9 credits)

501	Nursing Research: Methods, Design & Analysis	3
500	Thesis	6
OR		

582	Scholarly Inquiry for Advanced Practice Nursing	3
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Concentration (12-17 credits)--choose one		
530-31	Adult Health Nursing I,II	12
544-45-46-47-48-49	Clinical Nurse Anesthesia Practicum/Seminar I, II, III, IV, V, VI	40
550-51	Nursing of Women and Children I,II	16
560-61	Mental Health Nursing I,II	12
570-71-72	Family Nurse Practitioner I,II,III	17
590-91	Nursing Administration I,II	12

Elective (9 credits)—Required for students in nursing administration concentration only.		
		9

*Not required for nursing administration concentration.

Students who enter the program as non-RNs must complete the following undergraduate nursing courses in addition to meeting the requirements listed above:

311	Foundations of Professional Nursing Practice	5
319	Pathophysiology of Health Deviations	4
333	Health Assessment	3
341	Health Promotion	3
351	Pharmacology I	2
361	Health Maintenance & Restoration across the Life Span	5
381	Professional Leadership Issues I	2
382	Health Promotion & Maintenance in the Community	4
406	Pharmacology II	2
415	Family/Community Health Nursing	6
421	Health Maintenance & Restoration in Mental Health	4
451	Professional Leadership Issues II	2
461	Health Restoration across the Life Span	5
482	Health Promotion, Maintenance & Restoration in the Community	4

Registered nurses whose bachelor's degrees are not in nursing must have completed courses in chemistry, nutrition, microbiology, anatomy, and physiology plus 12 hours of behavioral science courses. They must also complete 305, 382, 452, 482 and 490 and complete or successfully challenge the following:

311	Foundations of Professional Nursing Practice	5
319	Pathophysiology of Health Deviations	4
333	Health Assessment	3
351	Pharmacology I	2
361	Health Maintenance & Restoration across the Life Span	5
403	Health Promotion & Maintenance in Childbearing Families	5
406	Pharmacology II	2
421	Health Maintenance & Restoration in Mental Health	4
451	Professional Leadership Issues II	2
461	Health Restoration across the Life Span	5

A total of 19 credits can be obtained by successful completion of the NLN ACE Examination. See undergraduate catalog for other challenge options. RNs who are in the process of completing a BSN at UT with the intent of enrolling in the MSN program follow the same plan with the addition of 417.

Final Examination Requirements

All students must successfully complete a final examination as required by the Graduate Council. For thesis students, the examination will consist of an oral defense of the thesis as well as other written or oral questions designed to measure student mastery of the entire program of study. For non-thesis students, the written examination will cover the entire program of study and may, at the discretion of the student's committee, be followed by an oral examination.

Special Policies

1. If the clinical performance of any student for any course is found to be unsatisfactory, the student will receive a grade of "F" for the course.
2. If a student achieves a final grade of "D" or "F" for any required undergraduate or graduate nursing course, he or she will not be permitted to repeat the course and will be required to withdraw from the program.
3. If the clinical performance of any student is characterized by unethical, unprofessional or unsafe behavior, or behavior that places the client in jeopardy, the student will be required to withdraw from the program.

THE DOCTORAL PROGRAM

The College of Nursing offers a doctoral program leading to the Doctor of Philosophy degree with a major in Nursing. This is a unified program offered jointly with The University of Tennessee, Memphis, College of Nursing. Students may complete all or part of the program at either site. The dissertation must be completed in its entirety at one site.

The doctoral program prepares nursing scholars capable of integrating research, theory, and practice into their roles as researchers, educators, and/or administrators. Specifically, the graduate of this program should be able to:

1. Analyze, test, refine, and expand the theoretical basis of nursing.
2. Conduct research that generates knowledge and advances nursing as a discipline.
3. Provide leadership as nurse scientists who can function in a variety of roles and settings.
4. Collaborate with members of other disciplines in health-related research.
5. Develop, implement, evaluate, and recommend health care policy.
6. Demonstrate professionalism, advocacy, ethical principles and scientific integrity.

Admission Requirements

1. Meet requirements for admission to graduate study.
2. Hold a master's degree in nursing from a program accredited by the National League for Nursing. Some outstanding applicants who are prepared at the bachelor's level in nursing may be considered. In such cases, graduate level courses in nursing theory, concentration specialty, and/or research will be integrated into the formal program of doctoral degree requirements.
3. Have a minimum cumulative graduate grade-point average of 3.3 on a 4.0 scale for previous college work.

4. Have a combined score of at least 1000 on the verbal and quantitative sections of the Graduate Record Examination.

5. Have successfully completed a basic statistics course and graduate nursing theory and research courses prior to enrollment in nursing doctoral level courses.

6. Have TOEFL scores of at least 550 if native language is not English.

7. Complete Graduate Program Data Form, College of Nursing.

8. Submit Graduate Rating Forms from three college level instructors and/or nurses and administrators who have supervised applicant's professional work.

9. Submit a sample of scholarly writing (e.g., thesis, published paper).

10. Submit an essay describing personal and professional aspirations.

11. Submit Graduate Application for Admission, academic transcript(s), Graduate Record Examination scores, and, if required, TOEFL scores to the Office of Graduate Admissions. Submit three Graduate Rating Forms, sample of scholarly writing, and Graduate Program Data Form with essay to the Director of the PhD program prior to November 1 of the year prior to fall admission.

12. Schedule a personal interview with the College of Nursing PhD Student Admissions Committee prior to March 15 of the year preceding Fall admission. International applicants may be interviewed by telephone or teleconferencing at the discretion of the admissions committee.

Program Requirements

The following courses are required for all students:

601	Nursing Knowledge Development	3
602	Theory Analysis & Construction	3
603	Nursing Research and Inquiry	3
605	Middle-Range Theoretical Formulations for Nursing Science Development	3
606	Nursing Research Seminar	3
607	Qualitative Nursing Research	3
608	Quantitative Nursing Research	3
609	Research Practicum*	2
610	Nursing Science Seminar	2
611	Advanced Nursing Seminar	2
612	Health and Nursing Policy/Planning	3
613	Nursing Leadership in Complex Systems	3
---	Inferential Statistics	3
---	Multivariate Statistics	3
---	Cognates	6
---	Elective	3
600	Dissertation	24
TOTAL		72

*Note: 1 hour per semester must be taken for 2 semesters.

Possible cognate areas include, but are not limited to, anthropology, child and family studies, psychology, education, management, medical ethics, public health, social work, philosophy, and statistics.

Doctoral Committee

Early in the student's program, a nursing faculty advisor will be selected by the student in consultation with the program director. The student's comprehensive examination committee consists of the faculty teaching core courses and one representa-

tive from the cognate area. The student then selects the dissertation committee. Four faculty holding the rank of assistant professor or above comprise the committee, three of whom (including the chair) must be approved by the Graduate Council to direct doctoral dissertations. At least one member of the committee must be from an academic unit other than nursing.

Special Policies

1. A maximum of 6 graduate hours taken before acceptance into the doctoral program may be applied toward the degree.

2. Minimum grades of B in all nursing doctoral courses and a 3.0 cumulative GPA are required for continuation in the program.

MINOR IN GERONTOLOGY

Graduate students in the College of Nursing may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

POST-MASTER'S CERTIFICATE IN ADULT HEALTH NURSING

The College of Nursing offers a post-master's certificate program for nurses who need additional training in adult health nursing. Required for admission is a master's degree in nursing.

Course requirements are 530, 531, and 583, plus additional hours as determined by the college. The total hours will vary depending on the student's academic record, clinical experience and objectives. Students must complete a minimum of 12 credits. Typically students will complete 16-20 hours of course credit.

POST-MASTER'S CERTIFICATE IN FAMILY NURSE PRACTITIONER

The College of Nursing offers a post-master's certificate program for nurses who need additional training in family nurse practice. Required for admission is a master's degree in nursing.

Course requirements are 570, 571, and 572, plus additional hours as determined by the college. The total hours will vary depending on the student's academic record, clinical experience and objectives. Students must complete a minimum of 12 credits. Typically students will complete 16-20 hours of course credit.

POST-MASTER'S CERTIFICATE IN MENTAL HEALTH NURSING

The College of Nursing offers a post-master's certificate program for nurses who need additional training in mental health nursing. Required for admission is a master's degree in nursing.

Course requirements are 560 and 561, plus additional hours as determined by the college. The total hours will vary depending on the student's academic record, clinical experience and objectives. Students must complete a minimum of 12 credits. Typically students will complete 16-20 hours of course credit.

POST-MASTER'S CERTIFICATE IN NURSE ANESTHESIA

The College of Nursing offers a post-master's certificate program for nurses who possess a master's degree in nursing and desire to become Nurse Anesthetists. In addition to the general requirements for admission to graduate study and the College of Nursing, the following are required of all nurse anesthesia certificate applicants:

1. One year of critical care experience with adult clients.
2. Certification in Advanced Cardiac Life Support (ACLS) and Pediatric Advanced Life Support (PALS).
3. A personal interview.

Course requirements are 506, 516, 517, 518, 521, 522, 523 of nurse anesthesia didactic content, plus additional hours as determined by the college and 54 hours of nurse anesthesia clinical practice courses, 544, 545, 546, 547, 548, 549, 583. The total hours will vary depending on the student's academic record, clinical experience and objectives. Although students must complete a minimum of 12 credits, typically, students who have completed a master's degree in nursing within the preceding five years will complete 64-70 hours of course credit.

POST-MASTER'S CERTIFICATE IN NURSING ADMINISTRATION

The College of Nursing offers a post-master's certificate program for nurses who need additional training in nursing administration. Required for admission is a master's degree in nursing.

Course requirements are 590 and 591, plus additional hours as determined by the college. The total hours will vary depending on the student's academic record, clinical experience and objectives. Students must complete a minimum of 12 credits. Typically students will complete 16-20 hours of course credit.

POST-MASTER'S CERTIFICATE IN NURSING OF WOMEN AND CHILDREN

The College of Nursing offers a post-master's certificate program for nurses who need additional training in nursing of women and children. Required for admission is a master's degree in nursing.

Course requirements are 550 and 551, plus additional hours as determined by the college. The total hours will vary depending on the student's academic record, clinical experience and objectives. Students must complete a minimum of 12 credits. Typically students will complete 16-20 hours of course credit.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.S.N. program in Nursing is available to residents of the state of Oklahoma (concentration in nursing of women and children). The Ph.D. program is available to residents of Arkansas. Additional information may be obtained from the Administrative Services Assistant in the Office of Graduate Admissions.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E

501 Nursing Research: Methods, Design, and Analysis (3) Basic principles of research process in application to clinical questions; critical evaluation of nursing and health-related research. Prereq or coreq: Graduate level statistics. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N/C only. E

503 Health Promotion in Advanced Practice Nursing (3) Principles of health promotion, education, and innovative strategies for achieving wellness of individuals, families, groups, and communities. Prereq: Admission to MSN program or consent of instructor.

504 Advanced Health/Physical Assessment (3) Development of advanced clinical reasoning and assessment skills to determine client health status and needs. Application of physiological, pathophysiological, and psychosocial concepts with implications for advanced practice nursing. Prereq: Admission to MSN program or consent of instructor. Didactic (2.5) and lab (.5).

505 Advanced Clinical Pharmacology (3) Pharmacological agents utilized to treat common, recurrent health problems; indications, contraindications, side and interactive effects of commonly prescribed drugs. Prereq: Undergraduate pharmacology course or consent of instructor. F

506 Advanced Anesthesia Pharmacology (3) Continuation of 505. Pharmacological implications of anesthesia delivery to acutely ill patients with multi-system influences. Advanced states of illness, extremes of age, and co-morbidities. Agents used in general anesthesia, regional anesthesia, IV regional anesthesia, acute pain management, and chronic pain management. Anesthetic implications of pharmacotherapy in perioperative patients. Prereq: 505.

509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Exercise Science 509, Nutrition 509, and Social Work 509.)

510 Theoretical Foundations of Nursing (3) Historical evolution of nursing science; nursing's metaparadigm and selected philosophies, conceptual models and theories as structures which guide critical thinking in analysis, reasoning, and decision making for advanced practice nursing. Prereq: Admission to MSN program or consent of instructor. F,Sp

511 Statistical Applications to Nursing Research (3) Descriptive and inferential statistics: statistical concepts and applications to clinical settings and their applications to advanced practice nursing.

515 Advanced Pathophysiology for Nursing Practice (3) Advanced physiologic and pathophysiological concepts, principles, and theories applied to deviations of human systems. Prereq: Undergraduate pathophysiology course. Sp

516 Advanced Pathophysiology: Neurological/Cardiovascular with Anesthesia Implications (2) Review of anatomy and physiology and integration of pathophysiology involved in patients requiring anesthetic care for cardiac surgical procedures (both children and adults) with and without cardiopulmonary bypass, intercranial surgical procedures for vascular and mass occupying lesions, patients requiring somatosensory evoked potential monitoring, and patients requiring anesthesia for noncardiac and non-neurological procedures who present with either neurological and/or cardiovascular comorbidity. Prereq: 521. Coreq: 523.

517 Advanced Pathophysiology: Respiratory/Renal with Anesthesia Implications (2) Review of anatomy and physiology and integration of pathophysiology involved in administration of anesthesia for patients who present with renal or respiratory pathology. Pathological implications of acute and chronic renal failure, renal transplantation, pulmonary disease states: obstructive and restrictive diseases, one lung ventilation, and acute pulmonary disease states and their management. Prereq: 521. Coreq: 523.

518 Advanced Pathophysiology: Obstetrics/Regional Anesthesia (2) Review of anatomy and physiology and integration of pathophysiology involved in administration of regional blockade of upper and lower extremities. Local anesthetic pharmacology, indication for regional anesthesia, contraindications to specific blockade, and techniques for clinical administration of regional blockade. Regional anesthetic considerations for obstetric patient. Prereq: 521. Coreq: 523.

520 Advanced Practice Nursing and Health Delivery Systems (3) Nursing's role in dynamic health care system: health policy and organizational, social, ethical, political, economic and technological factors which impact advanced practice nursing and delivery of health care. Prereq: Admission to MSN program or consent of instructor. Sp

521 Basics of Nurse Anesthesia (6) Comprehensive orientation to principles and practice of anesthesia. Elementary and comprehensive approaches to clinical and professional practice of nurse anesthetist. Basic knowledge and guidelines necessary to administer anesthesia. Prereq: Admission to nurse anesthesia concentration.

522 Integrated Health Science for Anesthesia (3) Fundamental principles of chemistry and physics as related to practice of nurse anesthesia. Correlation of principles to clinical anesthesia practice. Prereq or coreq: 521.

523 Advanced Principles of Nurse Anesthesia Practice (2) Continuation of 521. Advanced concepts/principles of anesthetic management and legal implications of nurse anesthesia practice.

530 Adult Health Nursing I (6) Advanced nursing practice for health promotion, restoration, and maintenance of young, middle-aged, and older adults. Theories and research to advanced practice with individual clients in variety of settings. Prereq: 504, 505, 515. Prereq or coreq: 503, 510, 520. Didactic (2) and practicum (4). Sp

531 Adult Health Nursing II (6) Continuation of 530. Delivery, provision, and management of health care for adult groups and communities. Prereq: 530, 501. Prereq or coreq: 582, 583 (gerontology students only). Didactic (2) and practicum (4). F

544-45-46-47-48-49 Clinical Nurse Anesthesia Practicum/Seminar I, II, III, IV, V, VI (2-11) Integration and application of theoretical foundations and development of clinical skills in nurse anesthesia practice under supervision of Certified Registered Nurse Anesthetist (CRNA) and/or anesthesiologist. Prereq for 544: Admission to nurse anesthesia concentration. Prereq for 545: 544, 521, 504, 505. Must be taken in sequence.

550 Nursing of Women and Children I (8) Advanced practice nursing for women and children; clinical experience in role of nurse practitioner or clinical nurse specialist in variety of settings. Health promotion and nursing interventions for actual or potential health problems of women, children, and families. Prereq: 504, 505, 515. Prereq or coreq: 503, 510, 520. Didactic (3) and practicum (5). Sp

551 Nursing of Women and Children II (8) Continuation of 550. Role refinement of nurse practitioner or clinical specialist in health maintenance and restoration for women, children, and families. Prereq: 550, 501. Prereq or coreq: 582. Didactic (3) and practicum (5). F

552 Parent Child Nursing Field Work and Seminar (5) Seminar and intensive clinical practicum designed to facilitate further development of specialized knowledge and skills utilized for advanced parent-child nursing practice. Prereq or coreq: 551. 1 hr and 4 labs. Sp

557 Nurse Midwifery Seminar I (1) Exploration of art and science of midwifery, nature and scope of midwifery practice, professional and ethical issues in advanced nursing practice. Prereq or coreq: 501, 510. F

558 Nurse Midwifery Seminar II (1) Exploration of psychological, developmental, and sociocultural theories as related to individual and family patterns of illness and wellness. Role of nurse-midwife in advanced practice promoting optimal wellness within clients and community. Prereq: 501, 510, 570. Coreq: 520. Sp

559 Nurse Midwifery Seminar III (1) Exploration of state of science in nurse midwifery, innovative practice options, and related researchable problems in nurse-midwifery practice. Prereq: 570, 571. Coreq: 500, 580 or 582. F

560 Mental Health Nursing I (6) Theories of advanced therapeutic interventions for clients experiencing actual and potential mental health problems; advanced practice nursing in specialty of mental health; clinical practice with clients of various ages in acute care and community settings. Prereq: 504, 505, 515. Prereq or coreq: 503, 510, 520. Didactic (2) and practicum (4). Sp

561 Mental Health Nursing II (6) Continuation of 560. Advanced practice nursing in community settings for families and groups with actual and potential mental health problems. Prereq: 560, 501. Prereq or coreq: 582. Didactic (2) and practicum (4). F

565 Teaching Practicum (1-6) Individually designed teaching experience in collegiate nursing program or nursing practice setting. Objectives to be developed collaboratively by student and faculty. Prereq or coreq: 564 and consent of instructor. S/NC or letter grade. Sp

566 Educational Principles and Strategies (3) Exploration and analyses of selected education, curriculum; teaching-learning, measurement, and evaluation principles and theories as applied to instruction of undergraduate nursing students, staff development, and patient education. Prereq: Consent of instructor. Su

570 Family Nurse Practitioner I (4) Application of advanced health/physical assessment and diagnostic reasoning in nursing management and primary care and of individuals and their families with actual and potential acute health problems; clinical experience in role of family nurse practitioner in variety of settings. Prereq: 504, 505, 515. Didactic (2) and practicum (2). Sp

571 Family Nurse Practitioner II (6) Continuation of 570. Nursing management and primary care of individuals and their families in all developmental life stages; clinical experience in variety of settings. Prereq: 570. Prereq or coreq: 503, 510, 520. Didactic (2) and practicum (4). F

572 Family Nurse Practitioner III (7) Continuation of 571. Nursing management of chronic health problems of individuals and families in all developmental life stages; role refinement and exploration of major issues of family nurse practitioner; clinical experience in variety of settings. Prereq: 571, 501. Prereq or coreq: 582. Didactic (2) and practicum (5). Sp

577 Special Topics (1-3) Topic is determined by faculty and student interest. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

582 Scholarly Inquiry for Advanced Practice Nursing (3) Utilization of research process through experiential learning or critical evaluation of science in area of interest. Conducted under faculty guidance and culminating in scholarly paper. Prereq or coreq: 501 or consent of instructor. May be repeated. Maximum 6 hrs. E

583 Directed Clinical Practice (1-9) Additional opportunities for advanced nursing practice. Objectives to be developed collaboratively by student and faculty. Prereq: Enrollment in or completion of graduate level courses in clinical nursing. Maximum 9 hrs. S/NC or letter grade. E

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Counselor Education and Counseling Psychology 585, Exercise Science 585, Public Health 585, Psychoeducational Studies 585, Social Work 585, and Sociology 585.)

590 Nursing Administration I (6) Exploration, analysis and application of selected organizational, management, and leadership theories and financial principles to delivery of nursing services. Structure, functions, organization, behaviors, and adaptive processes of health care organizations. Prereq or coreq: 503, 510, 520. 2 hrs and 4 labs. Sp

591 Nursing Administration II (6) Continuation of 590. Utilization of human and financial resources, conflict resolution, and organizational development with application to mid-level and top-level nursing administration positions. Prereq: 590, 501. Prereq or coreq: 582. 2 hrs and 4 labs. F

593 Independent Study (1-3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

600 Doctoral Research and Dissertation (3-15) P/ NP only. E

601 Nursing Knowledge Development (3) Philosophical and historical context of knowledge for nursing science; extant nursing models and theories as frameworks for knowledge building; concept development in theory building. F

602 Theory Analysis and Construction (3) Analysis of existing theories of person, environment, health, nursing, and caring; introduction to and practical experience in process of nursing theory development. Prereq: 601, 610, or consent of instructor. Sp

603 Nursing Research and Inquiry (3) Philosophical, theoretical and methodological bases for nursing inquiry. Prereq: 601. Coreq: 602. Sp

605 Middle-Range Theoretical Formulations for Nursing Science Development (3) Extant and emerging middle-range theories instrumental in nursing science development. Prereq: 601, 602, 603, 610. Coreq: 608. F

606 Nursing Research Seminar (3) Selected topics pertaining to dissertation proposal process, research experience, and defense. Sp

607 Qualitative Nursing Research (3) Critique and application of qualitative nursing research methods. Prereq: 601, 602, 603. Su

608 Quantitative Nursing Research (3) Critique and application of quantitative nursing research methods. Prereq: 601, 602, 603, inferential statistics. Prereq or coreq: Multivariate statistics. F

609 Research Practicum (1-3) Supervised individual or group research experience under guidance of faculty. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs. S/NC or letter grade. E

610 Nursing Science Seminar (2) Critical Analysis and synthesis of literature in selected focus area within nursing science. Prereq: Admission to doctoral program in nursing or consent of instructor. F

611 Advanced Nursing Seminar (2) Exploration of historical and current issues of interest to doctorally prepared nurses. F

612 Health and Nursing Policy/Planning (3) Policies affecting nursing education and practice; health policies and political processes; interactions between health professionals, consumer groups, and government in health policy development and health planning activities. Sp

613 Nursing Leadership in Complex Systems (3) Analysis and evaluation of nursing leadership/management in complex professional, academic and health care systems. F

614 Nursing Preceptorship (3) Individually-designed practicum, field, or internship experiences in variety of administrative, educational, research, or clinical practice settings. Prereq: 601, 602. F,Su

Nutrition

(College of Human Ecology)

MAJORS

Human Ecology Ph.D.
Nutrition M.S., M.S.-M.P.H.

DEGREES

Michael B. Zemel, *Head*

Professors:

Beauchene, Roy E. (Emeritus),
Ph.D. Kansas State
Carruth, Betty Ruth (Emeritus), Ph.D. Missouri
Namey, T. C., M.D. Washington (St. Louis)
Sachan, Dileep S., Ph.D. Illinois
Skinner, Jean D., Ph.D. Oregon State
Whelan, Jay, Ph.D. Penn State

Zemel, Michael (Liaison), Ph.D. Wisconsin

Associate Professors:

Bailey, James W., Ph.D. Iowa State
Burney, Janie, Ph.D. Tennessee
Greer, Betty P., M.A. Tennessee
Haughton, B., Ed.D. Columbia
Karlstad, Michael, Ph.D. Loyola
Moussa, Naima, Ph.D. Paris

Assistant Professors:

Bittle, Joyce (Memphis), Ph.D. Tennessee
Chencharick, Judith (Memphis),
Ed.D. Memphis
Kim, Jung-Han, Ph.D. Tennessee
Truett, Gary, Ph.D. Georgia

The Master of Science program is available in Nutrition, with a concentration in nutrition science or public health nutrition.

A graduate degree combined with a Dietetic Internship (D.I.) beyond the baccalaureate degree qualifies the graduate to apply for the Registration Examination to become a Registered Dietitian (R.D.). Students may request more information from the department about the D.I. program. The Dietetic Internship is currently granted accreditation by the Commission on Accreditation for Dietetics Education of The American Dietetic Association, 216 W. Jackson Blvd., Chicago, IL 60606-6995, Tel: 312 899-5400. Students may also select an interdisciplinary minor in gerontology.

ADMISSION REQUIREMENTS

A complete file for review includes the Graduate Application for Admission file, completed departmental application form, Graduate Record Examination (GRE) scores for the general section, and three Graduate Rating Forms completed by individuals who can attest to the applicant's potential for graduate education. Forms may be obtained from the Departmental Office, 229 Jessie Harris Building, University of Tennessee, Knoxville, 37996-1900. Forms may also be obtained from the Department's website at <http://nutrition.he.utk.edu/>.

Admission into the graduate program in the department is dependent on completion of undergraduate courses that give the necessary background for success in the graduate program. Required undergraduate courses include: general and organic chemistry, physiological chemistry/biochemistry, physiology, statistics and advanced nutrition. Admission to the Ph.D. program in Human Ecology with a concentration in Nutrition Science requires a master's degree. Applicants to all programs with related experience may be given preference.

THE MASTER'S PROGRAM

Students may choose a thesis or non-thesis option in Nutrition. Attendance at Nutrition 540 is required every semester.

Thesis Option: The program consists of a minimum of 33 hours with at least 16 hours of coursework in the department. NTR 511, 512, 540, 541 and 3 hours of graduate level statistics are required. Students in public health nutrition must take 511, 512, 513, 514, 515, 541 and the minor in public health. Six hours of Thesis 500, and 6 hours outside the

department are required. A minimum of 22 hours at the 500 or 600 level is required.

An oral comprehensive examination is required upon completion of the thesis.

Non-Thesis Option: The program consists of a minimum of 36 hours with at least 20 hours of coursework in the department. NTR 511, 512, 540, 541, 2 hours from 542-544 and 3 hours of graduate level statistics are required. Students in public health nutrition must take 511, 512, 513, 514, 515 and the minor in public health. Six hours in one area outside the department are required. A minimum of 24 hours at the 500 and 600 level is required.

A written comprehensive examination is required for completion of the program.

DUAL M.S.-M.P.H. PROGRAM

The College of Human Ecology offers a coordinated dual program leading to the conferral of both the Master of Science with a major in Nutrition (public health nutrition concentration) and the Master of Public Health. The dual program allows students to complete both degrees in less time than would be required to earn both degrees independently.

The program is designed to meet the needs of students who are interested in the benefits of majors in both nutrition and public health. Therefore, it accommodates the interests of students who: 1) plan a career in public health nutrition and want to acquire the knowledge and skills of the nutritionist and public health professional; 2) plan a career in nutrition and want to acquire the knowledge and skills and the perspective of the public health professional; or 3) plan a career in public health and want to acquire the knowledge, skills and perspective of the nutritionist.

Admission Requirements

Applicants for the M.S.-M.P.H. program must make separate application to, and be competitively and independently accepted by, the Department of Nutrition for the M.S., Department of Health and Safety Sciences for the M.P.H., and the Public Health Academic Program committee.

Students who have been accepted by both departments may apply for approval to pursue the dual program anytime prior to, or after, matriculation in either or both departments. Such approval will be granted, provided that dual program studies be started prior to entry into the fourth semester of the M.S. and M.P.H. programs.

Curriculum

A dual degree candidate must satisfy the requirements for both the M.S. (public health nutrition concentration) and the M.P.H. degrees, as well as the requirements for the dual program. All candidates for the dual degree must successfully complete Health and Society (PH 555), two credits of Seminar in Public Health (PH 509), and a minimum of 60 credits. The Department of Nutrition will award a maximum of 9 semester hours of credit toward the M.S. degree for successful completion of approved graduate level courses offered in the Department of Health and Safety Sciences. The Department of Health and Safety Sciences will award a maximum of 11 semester hours of credit

toward the M.P.H. degree for successful completion of approved courses offered in the Department of Nutrition. All courses for which such cross-credit is awarded must be approved by the Public Health Academic program Committee and the student's graduate committee. A single block field experience (or public health internship) is required of all students and the analytical field paper incorporates public health nutrition and the student's public health concentration.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit towards the M.S. or M.P.H. degree for courses taken in the other program, except as such courses qualify for credit without regard to the dual program.

Approved Dual Credit

M.S. courses to be counted toward the M.P.H. program must include 10 semester hours of Field Study in Community Nutrition (NTR 515) and 1 semester hour of Graduate Seminar in Public Health (NTR 509). M.P.H. courses to be counted toward the M.S. include Public Health Administration (PH 520), Biostatistics (PH 530), and Epidemiology (PH 540).

THE PH.D. CONCENTRATION

The nutrition science concentration enables students to study the science of nutrition from the cellular level to the application of nutritional principles by people in a changing environment.

The doctoral program emphasizes cellular/molecular nutrition, human nutrition, nutritional epidemiology, and experimental nutrition. Cognate areas may include anthropology, biochemistry, chemistry, communications, education, food technology, human development, physiology, public health, sociology, statistics, and/or toxicology.

Minimum requirements include:

1. Sixteen hours in nutrition including 4 hours at the 600 level (exclusive of dissertation);
2. NTR 511, 512, 541, and 2 hours from either 542-544;
3. Four hours of NTR 540, attendance required every semester;
4. Six hours of statistics;
5. Six hours in a cognate area;
6. Nine hours at the 600 level;
7. Students without college teaching experience are required to take the fall semester teaching seminar for GTAs and NTR 548 comprising a faculty-supervised problem in college teaching.

MINOR IN NUTRITION

The graduate minor consists of Nutrition 511 and 512 plus at least three hours from any letter-graded 500-level or above nutrition courses.

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

508 Culture, Food, and Nutrition (3) Food-related behavior of individuals and groups in United States. Sociocultural, economic, and technological influences. Nutrition and food surveys, public policy. Prereq: Advanced Nutrition or consent of instructor. F,A

509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Exercise Science 509, Nursing 509 and Social Work 509.)

511 Advanced Physiological Chemistry (4) Bioenergetics, flux control and hormonal interrelationships. Prereq: Advanced Nutrition or equivalent. F

512 Human Nutrition (3) Advances in carbohydrates, proteins, fats, minerals, and vitamins. Nutrient requirements of humans. Prereq: Advanced Nutrition and 511. Sp

513 Community Nutrition I (3) Orientation to community; assessment of nutrition problems, needs, and resources; functional roles of public health nutritionist. Concurrent field experiences. Prereq: Advanced Nutrition or consent of instructor. F

514 Community Nutrition II (3) Planning, implementation, and evaluation of public health nutrition programs. Concurrent field experiences. Prereq: 513 or consent of instructor. Sp

515 Field Study in Community Nutrition (1-12) Personal participation in and analysis of state or regional community nutrition program. Location of in-depth study to be selected in consultation with instructor. Prereq: 513, 514 and consent of instructor. S/NC only. Su

516 Maternal and Child Nutrition (3) Nutrition principles related to growth and development during pregnancy, infancy, and childhood to age 5, high risk conditions. Prereq: Advanced Nutrition or consent of instructor. F

517 Childhood and Adolescent Nutrition (3) Application of nutrition principles to school age children; effects of diseases on growth and health maintenance; nutritional assessment and counseling for nutrition. Prereq: Advanced Nutrition or consent of instructor. Sp,A

518 Nutrition and Aging (3) Nutritional problems of adults; nutritional requirements, dietary intakes; effects of nutrition on biological aging. Prereq: Advanced Nutrition or consent of instructor. Su

520 Nutritional Ecology (2) Examination of issues in natural, political, physical, and social environments that impact availability of food and nutrients in U.S. food supply. F,A

521 Physiological Basis for Diet and Disease (3) Altered nutrient needs as result of metabolic changes that occur in selected disease states. Prereq: Nutrition in Disease or consent of instructor. Sp

522 Nutrition Counseling (2) Individual eating habits and disorders, evaluation strategies for effectiveness of helping process. Prereq: Nutrition in Disease or consent of instructor. F,A

524 Nutrition Education: Principles, Implementation, and Evaluation (3) Conceptual models, principles, application, and evaluation models in nutrition education research. Prereq: 508 or consent of instructor. Su,A

530 Molecular Application in Nutrient-Gene Interaction I (1) Theories and applications of gene regulation methodologies. Experimentation with DNA and RNA. RNA and DNA isolation and analysis to illustrate nutrient regulation of gene expression. Combination of lab/lecture.

540 Seminar in Nutrition (1) May be repeated. S/NC only. E

541 Research Methods (2) Basic principles of planning, conducting, and interpreting nutrition and foodservice systems administration research. Prereq: 6 graduate hrs in nutrition and food system administration and statistics. Sp

542 Advanced Experimental Nutrition (2) Application of research principles to individual project using experimental animals. Prereq or coreq: 541. Sp

544 Survey Methods in Food and Nutrition (2) Application of survey research methods to nutrition projects: assessment of food consumption, nutrient

intake, nutritional status, sociocultural-economic parameters, food production and service. Prereq or coreq: 541. Sp

547 Field Experience (3-9) Experience in food-related industry or agency under supervision of faculty member. Prereq: Consent of instructor. S/NC only. E

548 Directed Study in Nutrition (1-3) Advanced study in nutrition. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

549 Special Topics (1-3) Recent advances in nutrition or food systems administration. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. E

600 Doctoral Research and Dissertation (3-15) P/ NP only. E

602 Advanced Topics in Nutrition Science (1-3) Comprehensive individual study and group discussion of topics related to current problems in nutrition. Prereq: 512 or consent of instructor. May be repeated. F

603 Current Trends in Food and Sociocultural Change (2) Critical evaluation of research. Prereq: 508 or consent of instructor. F,A

Pathology

See *College of Veterinary Medicine and Comparative and Experimental Medicine*

Philosophy

(College of Arts and Sciences)

MAJOR	DEGREES
Philosophy	M.A., Ph.D.

John Hardwig, *Head*

Professors:

Aquila, Richard E., Ph.D.	Northwestern
Cebik, L. B. (Emeritus), Ph.D.	Nebraska
Cohen, Sheldon M., Ph.D.	Northwestern
Davis, John W. (Emeritus), Ph.D.	Emory
Edwards, Rem B. (Emeritus), Ph.D.	Emory
Graber, Glenn C., Ph.D.	Michigan
Hardwig, John, Ph.D.	Texas
Nolt, John E., Ph.D.	Ohio State
Postow, Betsy C., Ph.D.	Yale
Van de Vate, Dwight, Jr. (Emeritus), Ph.D.	Yale

Associate Professors:

Bennett, James O., Ph.D.	Tulane
Bohstedt, Kathleen Emmett (Liaison), Ph.D.	Ohio State
Hamlin, H. Phillips, Ph.D.	Georgia

Assistant Professors:

Kaplan, Jonathan M., Ph.D.	Stanford
McLeod, Carolyn W., Ph.D.	Dalhousie
Reidy, David A., Ph.D.	Kansas

The Department of Philosophy offers graduate study leading to the Master of Arts and Doctor of Philosophy. The M.A. program includes thesis and non-thesis options and offers a concentration in medical ethics and in religious studies. The Ph.D. program also has a concentration in medical ethics. Detailed information may be obtained from the Director of Graduate Studies in Philosophy.

THE MASTER'S PROGRAM

The department offers both a thesis and a non-thesis option. The course requirements for an M.A. with thesis are 30 hours, including 6 hours in Philosophy 500. Of non-thesis hours, at least two-thirds must be in courses at or above the 500 level. No philosophy course numbered under 400 may be taken for graduate credit. There are no particular courses that M.A. students are required to take. The nature of the student's coursework should be determined in consultation with the student's faculty committee. The non-thesis M.A. requires 30 hours of coursework of which at least two-thirds must be in courses at or above the 500 level. Students seeking the non-thesis option must also pass a final written examination on all work offered for the degree. An additional oral examination may be required. As a part of the Master's degree, and in addition to a final comprehensive examination, a culminating (capstone) experience is expected. Examples of culminating experiences include presenting a paper at a refereed national or regional philosophy conference, or presenting a paper at a departmental colloquium.

THE DOCTORAL PROGRAM

Students must hold an M.A. with a major in Philosophy or an equivalent degree when entering the Ph.D. program. Thirty-three hours of coursework beyond the M.A. are required, of which 6 hours will be in courses numbered above 600. See the Philosophy Department Graduate Student Handbook for specific course requirements.

Students must demonstrate a reading knowledge of one foreign language, normally a living language in which there exists a significant body of philosophical literature. (In special circumstances relating to the area of dissertation research, the Graduate Committee may approve a language not satisfying these conditions.) This may be done by passing the doctoral language examination given by the appropriate department, if available, or by passing French 302 or German 332 with a B or better. Bi- or multilingual (normally, foreign) students, whose native language (other than English) is one in which there is a significant body of philosophical literature, are exempted from the foreign language requirement. Students receiving the Ph.D. with concentration in medical ethics are also exempted.

CONCENTRATIONS

Medical Ethics

The department has an M.A. and Ph.D. program of graduate study with a concentration in medical ethics. Detailed information concerning the program may be obtained from either the Director of Graduate Studies in Philosophy or the Director of the Medical Ethics Program.

Religious Studies

The department has an M.A. program of graduate study with a concentration in religious studies. Details concerning the program may be obtained from the Director of Graduate Studies in the Department of Religious Studies.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.A. program in Philosophy is available to residents of the states of Alabama, Delaware, or West Virginia; (concentration in medical ethics) Kentucky, Oklahoma, Texas, or Virginia; the Ph.D. program to residents of Alabama, Kentucky, Louisiana, Mississippi, Texas, Virginia or West Virginia. Additional information may be obtained from the Administrative Services Assistant in the Office of Graduate Admissions.

GRADUATE COURSES

400 Special Topics (3) May be repeated when topic varies. Maximum 6 hrs.

411 Modern Religious Philosophies (3) (Same as Religious Studies 411.)

419 Science as Method (3) (Same as Ecology and Evolutionary Biology 419 and Botany 419.)

420 Topics in History of Philosophy (3) Figures or movements from antiquity through mid-twentieth century. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 9 hrs.

435 Intermediate Formal Logic (3) Metatheory of formal logic and philosophy of logic. Prereq: Consent of instructor.

440 Contemporary Ethical Theory (3) Topics in meta-ethics or ethics. Prereq: 6 hrs of philosophy or consent of instructor.

446 Theoretical Issues in Medical Ethics (3) Prereq: 240 or 345 or consent of instructor.

462 Philosophy of Biology (3) Current issues: nature of natural selection, adaptation, and fitness; level of selection debate; nature of species; interaction of environment and organism, and others. Prereq: upper division coursework in philosophy or biology or consent of instructor.

472 Philosophy of Language (3) Problems of meaning, reference and truth. Relation between words and world. How sentences manage to be about the world. What is true? Prereq: 3 philosophy courses 200 level or above.

473 Philosophy of Mind (3) Problems of mind and body in relation to consciousness and personal identity. Prereq: 6 hrs of philosophy or consent of instructor.

479 Studies in Recent Continental Philosophy (3) Selected thinkers or topics: existentialism, phenomenology, hermeneutics, structuralism, post-structuralism. Prereq: 6 hrs of philosophy or consent of instructor. May be repeated when topic varies. Maximum 6 hrs.

500 Thesis (1-15) P/NP only. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

510 Philosophical Research (3) Paper workshop (writing, revising papers, getting papers ready to publish). Does not count toward hours required for degree. May be repeated. S/NC only.

520 Topics in Ancient or Medieval Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

522 Topics in Modern Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

524 Topics in Twentieth-Century Philosophy (3) Intensive critical work on major philosopher or school. May be repeated. Maximum 9 hrs.

528 Topics in Contemporary Philosophy (3) Intensive critical work on themes in late 20th-century philosophy. May be repeated. Maximum 9 hrs.

540 Topics in Ethics or Value Theory (3) May be repeated. Maximum 9 hrs.

542 Topics in History of Ethics (3) Dominant movements in history of ethics. May be repeated. Maximum 9 hrs.

544 Topics in Applied Ethics (3) Single author, tradition, or topic in ethical theory, application to issues in health, business, technology, ecology, and other practical fields. May be repeated. Maximum 9 hrs.

546 Orientation to Medical Ethics (3) Survey of ethical theories in application to issues in medical ethics.

547 Ethical Issues in Mental Health (3) Values in "mental health" and "mental illness," informed consent in psychiatry, competence, patients' rights, involuntary hospitalization and treatment, and behavior control therapies.

548 M.A. Clinical Practicum (3) Series of clinical rotations at one or more local health care institutions. Open only to graduate students concentrating in medical ethics. Prereq: 547 and consent of Medical Ethics Committee and the UTMCK Graduate Education Committee.

575 Topics in Metaphysics and Epistemology (3) May be repeated. Maximum 9 hrs.

577 Topics in Philosophy of Mind (3) Relation of mental to physical and of role of words in discourse for mental activities, thinking and feeling. May be repeated. Maximum 9 hrs.

585 Special Topics (3) May be repeated. Maximum 9 hrs.

587 Advanced Clinical Medical Ethics (3) Critical concepts in medical ethics, relationship of theory to practice, and professional roles and responsibilities for health care ethics consultant. Open only to Ph.D. students concentrating in medical ethics. Prereq: Consent of Medical Ethics Committee.

588 Ph.D. Clinical Practicum (9) Series of clinical rotations at one or more local health care institutions. Open only to Ph.D. students concentrating in medical ethics. Prereq: 587 and consent of Medical Ethics Committee and the UTMCK Graduate Education Committee.

590 Topics in Social and Political Philosophy (3) Philosophical problems concerning social and political life: family, state, freedom, justice; major theoretical responses: anarchism, social contract, Marxism. May be repeated. Maximum 9 hrs.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

600 Doctoral Research and Dissertation (3-15) P/ NP only. E

620 Topics in Ancient or Medieval Philosophy (3) May be repeated. Maximum 9 hrs.

622 Topics in Modern Philosophy (3) May be repeated. Maximum 9 hrs.

624 Topics in Contemporary Philosophy (3) May be repeated. Maximum 9 hrs.

640 Topics in Ethics or Value Theory (3) May be repeated. Maximum 9 hrs.

646 Topics in Applied Ethics (3) Prereq: Consent of Medical Ethics Committee. May be repeated. Maximum 9 hrs.

Physics and Astronomy

(College of Arts and Sciences)

MAJOR DEGREES
Physics M.S., Ph.D.

Soren Sorensen, *Head*

Professors:

- Barnes, F. E., Ph.D. California
- Bingham, C. R., Ph.D. Tennessee
- Blass, W. E., Ph.D. Michigan State
- Breinig, M., Ph.D. Oregon
- Bugg, W. M., Ph.D. Tennessee
- Callcott, T. A., Ph.D. Purdue
- Childers, R. W., Ph.D. Vanderbilt
- Crater, H. W. (UTSI), Ph.D. Yale
- Eguluz, A. G., Ph.D. Brown
- Elston, S. B., Ph.D. Massachusetts
- Georghiou, S., Ph.D. Manchester
- Guidry, M. W., Ph.D. Tennessee
- Handler, T., Ph.D. Rutgers
- Kamychkov, I., Ph.D. ITEP (Russia)
- Lewis, J. W. L. (Distinguished Prof.) (UTSI), Ph.D. Mississippi
- Macek, J. (Distinguished Scientist), Ph.D. Rensselaer
- Mahan, G. D. (Distinguished Scientist), Ph.D. California
- Nazarewicz, W., Ph.D. Warsaw
- Painter, L. R., Ph.D. Tennessee
- Pegg, D. J., Ph.D. New Hampshire
- Plummer, E. W. (Distinguished Scientist), Ph.D. Cornell
- Quinn, J. J. (Willis Lincoln Chair of Excellence), Ph.D. Maryland
- Riedinger, L. L., Ph.D. Vanderbilt
- Shih, C. C. (Liaison), Ph.D. Cornell
- Sorensen, S. P., Ph.D. Copenhagen
- Strayer, M. R., Ph.D. MIT
- Thompson, J. R., Ph.D. Duke
- Ward, B. F. L., Ph.D. Princeton
- Weitering, H. H., Ph.D. Groningen (Netherlands)

Associate Professors:

- Dai, P., Ph.D. Missouri
- Davis, L. (UTSI), Ph.D. Auckland
- Ferrell, T. L., Ph.D. Clemson
- Levin, J. C., Ph.D. Oregon
- Mandrus, D. G., Ph.D. SUNY (Stony Brook)
- Parigger, C. (UTSI), Ph.D. New Zealand
- Read, K. F., Ph.D. Cornell
- Shieh, S. Y., Ph.D. Maryland
- Siopsis, G., Ph.D. Cal Tech

Assistant Professors:

- Daunt, S. J., Ph.D. Queens
- Dean, D. J., Ph.D. Vanderbilt
- Sanders, A. J., Ph.D. Tufts

Research Professors:

- Pinnaduwege, L. A., Ph.D. Pittsburgh
- Thonnard, N., Ph.D. Kentucky
- Zhang, J. Y., Ph.D. Lanzhou

Research Associate Professor:

- Datskos, P.E., Ph.D. Tennessee

Research Assistant Professors:

- Efremenko, Y. Y., Ph.D. ITEP (Russia)
- Yost, S. A., Ph.D. Princeton

Graduate programs leading to the Master of Science and Doctor of Philosophy are offered in a number of concentration areas: astrophysics; atomic, molecular, optical and low temperature physics; biophysics; chemical physics; condensed matter and surface physics; elementary particle physics; geophysics (Master's only); health physics (Master's only); mathematical and computational physics; nuclear and relativistic heavy ion physics; and theoretical physics.

Departmental graduate programs leading to the M.S. and Ph.D. are also available at The University of Tennessee Space Institute, Tullahoma, where opportunities for study and research are available in laser applications, quantum and applied optics, laser spectroscopy, fluid physics, medical physics, computational physics, and theoretical physics. For additional information, contact the department head.

ADMISSION REQUIREMENTS

A student who enrolls in graduate study with the intention of attaining an advanced degree in Physics will have completed an undergraduate major in Physics or its equivalent. Physics 311-12, 321, 361, 431-32, 421, 461, and 411-12 constitute the minimum courses prerequisite to graduate study.

A student who intends to present Physics as a graduate minor will have completed an undergraduate minor in Physics or its equivalent. Physics 311 and 431-32 constitute the minimum coursework prerequisite to a minor in Physics.

In addition to meeting the Graduate Council's minimum requirements, applicants are strongly encouraged to submit scores from the Graduate Record Examination (general and subject).

All first-year graduate students are required, for advising purposes only, to take a diagnostic examination in undergraduate physics during the fall semester registration period.

THE MASTER'S PROGRAM

Thesis Option

The course requirements include 24 semester hours of physics courses, of which at least 12 hours are taken from Physics 511-12 or 513-14, 521-22, 531-32, 541-42, or 571-72. Each candidate must present an acceptable thesis, 6 hours of 500, and pass an oral examination on course material and thesis.

The department offers an M.S. thesis program with a concentration in geophysics. Program requirements are: 12 hours from Physics 513-14, 531-32, 541-42, 571-72; a minimum of 12 additional hours in geology, geophysics, and/or physics, as approved by the student's committee; and the presentation of an acceptable thesis, 6 hours of Physics 500, and the passing of an oral examination on course material and thesis.

Project Option

The course requirements include a minimum of 30 semester hours of graduate credit in courses composed of Physics 506, 511-12; 6 hours from Physics 593, 594 for a Project in Lieu of Thesis; 9 hours from general physics: 411-12, 421, 431-32, 461-62, 507, 508, 521-522, 531-32, 541-42, 555, 571-72 (at least 3 hours above the 500 level); and 6 hours from a single minor field outside of the physics department, such as computer science, mathematics, engineering, chemistry, biology, education, business, or law.

The candidate must pass an oral examination on course material and on the Project representing the culmination of an original research project completed by the student. A written report must be approved and accepted by the Physics Graduate Committee and the Department Head. An electronic version of the written report must also be submitted to the permanent electronic archive of the Physics Department available to the Internet.

Non-Thesis Option

Students seeking the non-thesis option must apply to the department's graduate committee for permission to enroll under this program. The requirements are the satisfactory completion of 30 semester hours of coursework composed of 18 hours from Physics 511-12 or 513-14, 521-22, 531-32, 541-42, and 571-72; 6 hours in a minor field; and 6 hours from other courses numbered above 400 (preferably of advanced laboratory nature.) At least 20 hours must be taken at the 500-level or above. In addition, the candidate must pass a written examination administered by his/her committee.

THE DOCTORAL PROGRAM

All students are expected to take the graduate core curriculum in physics consisting of the following courses: Physics 521-22, 531, 541, 551, and 571. Students concentrating in chemical physics may substitute Chemistry 572 for Physics 551, and should complete at least 6 semester hours from Chemistry 570, 571, 670. Students must take a minimum of 15 hours of 600-level courses, with 6 of these hours in their concentration area. Physics 601-02 are normally required of students concentrating in atomic physics; Physics 621-22 of students in nuclear physics; Physics 626-27 of students in elementary particle physics (and/or Physics 613-14 for students concentrating in theoretical physics); and Physics 671-72 of students in condensed matter and surface physics.

To be admitted to Ph.D. candidacy students must: a) fulfill all general requirements by the Graduate Council, b) pass the qualifying examination, c) have at least a 3.0 GPA on the graduate core curriculum in physics, d) form a doctoral committee and e) pass the comprehensive examination.

The qualifying examination is designed to test the student's general knowledge of the fundamentals of physics. The performance needed to pass this examination corresponds to a mature command of the material typically included in the undergraduate physics major curriculum. The qualifying examination should be passed after the

student's first year of study. Based on the student's performance on a) the qualifying examinations, b) the coursework, c) the GRE scores and d) optional research participation, the faculty will decide if the student will be allowed to continue in the Ph.D. program.

Students are required to find a research advisor and form a doctoral committee before the end of the second year of study. This committee is responsible for advising the student and monitoring his/her progress toward the doctoral degree.

The comprehensive examination is designed to test the student on a) specific knowledge and skills in the areas essential to the student's research program, b) capability to successfully complete the doctoral dissertation and c) general knowledge of the graduate core curriculum. The most essential component of this examination is the presentation and defense of an original research proposal. The comprehensive examination must be passed before the end of the third year of study. It contains both a written and an oral component and is conducted by the student's doctoral committee and an additional faculty member appointed by the department head.

The dissertation topic will be chosen with reference to one of the fields in which research facilities can be made available either at The University of Tennessee laboratories in Knoxville; The University of Tennessee Space Institute at Tullahoma, Tennessee; the Oak Ridge National Laboratory, Oak Ridge, Tennessee; or at other research facilities used by the University faculty.

Astronomy

GRADUATE COURSES

411 Astrophysics (3) Development of analytical physical models of galactic structure of universe, stellar and interstellar matter, and planetary systems. Topical and interdisciplinary, consideration of quasars, pulsars, black holes and current developments in field. Acceptable for major credit in physics. Prereq: Physics 136 Introduction to Physics for Physical Science and Mathematics Majors, or 138 Honors Fundamentals of Physics for Physics Majors, or 222 Elements of Physics, or 232 Fundamentals of Physics: Wave Motion, Optics, and Modern Physics, and consent of instructor.

490 Special Topics in Astronomy (1-3) Topics of current interest in astronomy and astrophysics. Acceptable for graduate credit in physics with consent of department. May be repeated with consent of department. Maximum 9 hrs.

Physics

GRADUATE COURSES

411-12 Introduction to Quantum Mechanics (3,3) Fundamental principles of quantum mechanics and methods of calculation. Solution of Schrodinger equation for simple systems. Application to atomic, molecular, nuclear, and condensed matter physics. Must be taken in sequence. Prereq: Fundamentals of Physics: Modern Physics or equivalent, Mathematics 435.

421 Modern Optics (4) Transmission of light in uniform, isotropic media; reflection and transmission at interfaces; mathematics of wave motion and interference effects. Rudiments of Fourier optics and holography. Prereq: 431, or Introduction to Physics for Physical Science and Mathematics Majors or Honors:

Fundamentals of Physics for Physics Majors or Fundamentals of Physics: Wave Motion, Optics, and Modern Physics and consent of instructor. 3 hrs and 3 labs.

431-32 Electricity and Magnetism (3,3) Electrostatics, magnetostatics, coupled electric and magnetic fields, Maxwell's Equations, electromagnetic waves and radiation. Prereq: Honors: Fundamentals of Physics for Physics Majors or Fundamentals of Physics: Wave Motion, Optics, and Modern Physics.

461-62 Modern Physics Laboratory (3,3) 461 - Introduction to fundamental and modern techniques in experimental physics, and to theory and practice of measurement and data analysis. Selected experiments in nuclear, atomic, molecular and solid state physics, and modern optics. Prereq: Electronics Laboratory and either Fundamentals of Physics: Modern Physics or 411. 462 - Advanced experiments and experimental techniques in modern physics; experimental team work. Thorough quantum mechanical interpretation of results and preparation of scientific reports. Prereq: 461. 6 hrs lab per week.

490 Senior Seminar (1-3) Topic of current interest. May be repeated with consent of department. Maximum 6 hrs.

500 Thesis (1-15) P/NP only. E

501 Graduate Research Participation (3) Advanced research techniques under supervision of staff research director whose research area coincides with interests of student. Open to all graduate students in good standing. Prereq: Consent of department and research director. May be repeated with consent of department. Maximum 18 hrs. S/NC only. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

503 Physics Colloquium (1) Lectures and discussion on current research topics. Continuous registration required for current graduate students. May be repeated. Maximum 6 hrs. S/NC only. E

505 Physics of Fluids (3) Fluid physics, overview of fluid mechanics and associated computational techniques; general description of laminar and turbulent flows; subsonic, supersonic and hypersonic flows; continuum, transitional and free-molecular flows; pipe flow, nozzle flow and sonic orifice expansion flows; reacting and nonreacting flowfields; shock-tube physics; and introduction to method of characteristics and Monte Carlo computational techniques.

506 Experimental Methods (3) Principles, real operational behavior, and hazards of laser types, radiation detectors, photomultiplier tubes, image intensifiers, image converters, image dissectors, streak cameras, and fast-framing cameras; high-vacuum systems including cryogenic-based devices, data acquisition techniques including synchronous detection, digital electronics methods and micro-computer data acquisition and registration methods.

507 Contemporary Optics (3) Topics in geometrical, physical, Fourier, and nonlinear optics and introductory laser physics. Extensive use of computer calculations and design of practical and sophisticated optical systems.

508 Laser Physics (3) Mode analysis, stable and unstable resonators; rate equations and population inversion, saturation, relaxation oscillations, fluctuations and noise, laser stability; quantum theory of laser, photon coherence; mode-locking, Q-switching and frequency stabilization; specific laser types: semiconductor and solid-state, excimer, copper vapor and dye lasers.

511-12 Theoretical Physics (3,3) Concepts and applications in applied physics. Topics: one-body, two-body and rigid body dynamics, ideal fluid, small oscillations and waves, elements of special relativity, electrostatic and magneto-static problems, EM waves, duality and quantization, absorption and emission, statistical ensemble and thermal equilibrium, and other modern applications of current interest, in areas of quantum chemistry, biophysics, optics, spectroscopy, and astrophysics. Recommended background: Familiarity with computational methods.

Plant Sciences and Landscape Systems

(College of Agricultural Sciences and Natural Resources)

MAJORS

DEGREES

Ornamental Horticulture and Landscape Design M.S.
Plant and Soil Sciences M.S., Ph.D.

G. Neil Rhodes, Jr., *Interim Head*

Professors:

Albrecht, Mary L., Ph.D. Ohio State
Allen, Fred L., Ph.D. Minnesota
Ashburn, Elmer L. (Emeritus),
Ph.D. Tennessee
Augé, Robert M., Ph.D. Washington State
Burns, Joe D. (Emeritus), M.S. Auburn
Callahan, Lloyd M. (Emeritus), Ph.D. ... Rutgers
Coffey, David L., Ph.D. Purdue
Conger, Bob V. (Distinguished Prof.),
Ph.D. Washington State
Crater, G. Doug (Emeritus), Ph.D. ... Ohio State
Deyton, Dennis E., Ph.D. NC State
Flinchum, Wayne T. (Emeritus),
Ph.D. Louisiana State
Fribourg, Henry A. (Emeritus),
Ph.D. Iowa State
Graham, Earnest T. (Emeritus),
Ph.D. Penn State
Hayes, Robert M., Ph.D. Illinois
Lockwood, David W., Ph.D. Georgia
McDaniel, Gary L., Ph.D. Iowa State
Miller, Robert D., Ph.D. Kentucky
Mullins, Charles A., Ph.D. Tennessee
Reynolds, John H., Ph.D. Wisconsin
Rhodes, G. Neil, Jr., Ph.D. NC State
Rutledge, Alvin D. (Emeritus),
Ph.D. Tennessee
Samples, Tom J., Ph.D. Oklahoma State
Sams, Carl E., Ph.D. Michigan State
Sams, David W. (Emeritus), Ph.D. ... Minnesota
Shelby, Paulus P. (Emeritus), M.S. Tennessee
Stewart, C. Neal (Racheff Chair),
Ph.D. Virginia Tech
West, Dennis R., Ph.D. Nebraska
Williams, Don B. (Emeritus), Ph.D. Penn State

Associate Professors:

Bates, Gary E., Ph.D. Georgia
Cheng, Z. Max, Ph.D. Cornell
Gwathmey, C. Owen, Ph.D. California (Davis)
Hamilton, Susan L., Ed.D. Tennessee
Menendez, Garry L., M.S. Tennessee
Mueller, Thomas C., Ph.D. Georgia
Rogers, Sam M., M.L.A. Georgia
Wyatt, Jim E., Ph.D. Florida

Assistant Professor:

Garton, Stephen, Ph.D. Minnesota
Klingeman, Bill E., Ph.D. Georgia
Morgan, Gaylon, Ph.D. Wisconsin
Pantalone, Vincent R., Ph.D. NC State
Robinson, Darren K., Ph.D. NC State
Sorochon, John, Ph.D. Michigan State
Straw, R. Allen, Ph.D. Tennessee

513 Problems in Theoretical Physics I (3) Fundamentals of physics: classical mechanics (Newtonian mechanics, Lagrangian and Hamiltonian dynamics) and electrostatics and magnetostatics.

514 Problems in Theoretical Physics II (3) Fundamentals of physics: electrodynamics, relativity, and quantum mechanics.

521-22 Quantum Mechanics (3,3) Fundamental principles of quantum mechanics, angular momentum, electron spin, particles in electric and magnetic fields, perturbation theory, variational methods, scattering theory; second quantization, quantization of electromagnetic field, emission, absorption, and scattering of light, bremsstrahlung, pair creation and annihilation. Application of quantum mechanics to problems of atomic, molecular, nuclear, and solid state physics. Prereq for 522: 521

531 Classical Mechanics (3) Variational formulation, Lagrange's and Hamilton's equations, constraints, canonical transformations, Hamilton-Jacobi theory and action-angle variables.

532 Advanced Classical Mechanics (3) Advanced topics in classical mechanics, KAM theorem and Hamiltonian chaos, dissipative chaos. Topics may vary according to interest of students and instructor. Prereq: 531.

541-42 Electromagnetic Theory (3,3) 541—Review of electrostatics, magnetostatics, and quasi-static problems; Maxwell's field equations and their solutions in dielectric and conducting media; electrodynamics and relativity, retarded potentials and gauge transformations, radiation produced by accelerating charges. 542—Advanced treatment of Electrodynamics, collisions between charged particles, bremsstrahlung, multipole fields. Topics may vary according to interest of students and instructor. Prereq or coreq for 541: 571. Prereq for 542: 541.

551 Statistical Mechanics (3) Ergodic theory, classical ensemble theory, quantum mechanical ensembles, relation of statistical mechanics to thermodynamics, transport theory and approach to equilibrium, phase transition, fluctuations and correlations. Prereq: 521, 531, 571-72. Prereq or coreq: 522.

555 Solid State Physics (3) Elementary solid state physics. Crystal structures, reciprocal lattice, bonding in solids, energy bands, semiconductors, phonons, free-electron-gas theory of metals, superconductivity, magnetism, and other forms of broken symmetry. Prereq: 522 or consent of instructor.

561 The Theory of Relativity (3) Geometry of space-time, relativistic electrodynamics, particle mechanics and continuum mechanics, Einstein's field equations, Schwarzschild solutions, the classical test of general relativity. Prereq or coreq: 531 and 542.

571-72 Mathematical Methods in Physics (3,3) Linear vector spaces, matrices, tensors, curvilinear coordinates, functions of a complex variable, partial differential equations and boundary value problems, Green's functions, integral transforms, integral equations, spherical harmonics, Bessel functions, calculus of variations. Prereq: Advanced calculus and differential equations. Must be taken in sequence. (Same as Mathematics 517-18.)

573 Numerical Methods in Physics (3) Numerical methods for solution of physical problems, use of digital computers, analysis of errors. Prereq: 571-72 or consent of instructor.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

594 Special Problems (3) Especially assigned theoretical or experimental work on problems not covered in other courses. May be repeated. Maximum 9 hrs. E

599 Seminars (1-3) a. Mechanics; b. Radiation; c. Heat and Thermodynamics; d. Electricity and Magnetism; e. Modern Physics. May be repeated with consent of department. Maximum 18 hrs. E

600 Doctoral Research and Dissertation (3-15) P/ NP only. E

601-02 Atomic Physics (3,3) 601—Survey of research problems and methods. Topics of current interest. Intended for all graduate students. 602—Advanced problems for students specializing in field.

605 Laser Spectroscopy (3) Applications of lasers to spectroscopy of atomic and molecular systems; absorption, laser-induced fluorescence, and Raman spectroscopy; molecular and atomic coherence, quantum beats, resonance fluorescence, photon echoes, self-induced transparency; saturation and Doppler-free spectroscopy; laser cooling and trapping. Prereq: 521, 541.

606 Nonlinear Optics (3) Nonlinear optical susceptibilities, wave propagation in nonlinear media, sum-frequency and difference frequency generation, harmonic generation, parametric amplification and oscillation, stimulated Raman processes, two- and multi-photon processes, four-wave mixing and phase conjugation, transient coherent optical effects and free induction decay, optical breakdown and nonlinear effects in plasmas. Prereq: 522.

610 Quantum Optics (3) Quantum theory of emission and absorption of radiation; frequency-dependent susceptibility; coherence theory; field quantization and coherent photon states; interaction of radiation with atoms; photon optics, counting and higher-order coherence; atomic scattering phenomena. Prereq: 521.

611 Advanced Quantum Mechanics and Field Theory (3) Survey of problems and methods. Topics of current interest. Intended for all graduate students.

612 Advanced Topics in Quantum Field Theory (3) Renormalization, Lamb shift, anomalous magnetic moments, gauge theories, electroweak theory, quantum chromodynamics, grand unified theories, and advanced topics in laser physics and quantum optics. Topics vary according to interest of students, instructor and present state of physics. Prereq: 561 or 611 or consent of instructor.

613-14 Quantum Field Theory (3,3) Modern formulation of quantum field theory and its applications: perturbative methods, renormalization, gauge theories (QED, the standard model, GUTs and their supersymmetric extensions), string theory and quantum gravity.

621-22 Nuclear Physics (3,3) 621—Survey of research problems and methods. Topics of current interest. Intended for all graduate students. 622—Advanced problems intended for students specializing in the field.

626-27 Elementary Particle Physics (3,3) 626—Survey of elementary particle physics: experimental methods, conservation laws, invariance principles, and models of interactions. Intended for all graduate students. 627—Advanced topics intended for students specializing in field: quark models, electroweak interactions and unification of elementary forces.

642 Advanced Topics in Modern Physics (3) Advanced theoretical or experimental topics not covered in other courses. May be repeated with consent of department. Maximum 9 hrs.

643 Computational Physics (3) Developing computer algorithms for solving representative problems in various fields of physics, celestial dynamics in astrophysics, boundary value problems in electromagnetism, atomic and nuclear structures, band structure in solid state physics, transport problems in statistical mechanics, Monte Carlo simulation of liquids, fitting and interpolation of data, correlation analysis, or optimization strategy. Prereq: 522, 531, 542, and 572.

671-72 Advanced Solid State Physics (3,3) 671—Survey of research problems and methods. Topics of current interest. Intended for all graduate students. 672—Advanced problems intended for students specializing in field.

The Plant Sciences and Landscape Systems Department offers graduate programs leading to the Master of Science and the Doctor of Philosophy degrees with a major in Plant and Soil Sciences and a Master of Science degree with a major in Ornamental Horticulture and Landscape Design. Concentrations in the Plant and Soil Sciences programs include soil science, plant breeding and genetics, and crop physiology and ecology. Concentrations in the Ornamental Horticulture and Landscape Design program include landscape design, turfgrass, woody ornamentals, and public horticulture. Various interests may be emphasized in any of these commodity areas, including micropropagation, innovative production and maintenance systems, and molecular biology, genetics, histology and stress physiology of ornamentals.

For further information, contact the department head.

THE MASTER'S PROGRAM

Ornamental Horticulture and Landscape Design

Admission Requirements: Students having bachelor's degrees in fields both related and unrelated to ornamental horticulture may apply, although acceptance may require some prerequisite courses. For admission to the M.S. degree program, a student must meet all of the requirements of the Graduate Council and must have completed (in semester hours): 12 hours of upper level ornamental horticulture and/or landscape design (in some cases, depending on individual student's interests and up to the discretion of a major professor in consultation with the OHLD Graduate Coordinator, upper level courses in other agricultural, biological or environmental subjects may substitute for some or all of these hours); 6 additional hours of biological science; 6 hours of math; 8 hours of chemistry. In addition, three completed rating forms and a written statement of career goals and interest in ornamental horticulture are required.

Students from non-science fields applying for the program may wish to enroll as non-degree graduate students while taking prerequisites.

Both thesis and non-thesis options are available, each guided by a graduate committee with three or more faculty members. For further information see web site at <http://ohld.ag.utk.edu/psls/>, or contact the graduate liaison.

Degree Requirements:

1. Approval of the academic program by the master's committee.
2. Successful completion of 12 hours of coursework in Ornamental Horticulture and Landscape Design and Integrated Plant Systems at the graduate level (400 or above), exclusive of Ornamental Horticulture and Landscape Design 500, 502, and 503. Two of these hours must be 590. Six of these hours may be satisfied by Botany 412, 521, 522, Plant and Soil Sciences 532, Plant Sciences and Landscape Systems 471, Animal Science 571, Ecology and Evolutionary Biology 520, or Information Sciences 560, Human Resource Development 521, 522, 562, Art 481, or Geography 439.

3. Attendance at graduate seminar each semester enrolled.

4. Preparation of a publication-ready, written or graphic communication.

Thesis Option:

1. Satisfactory preparation of a written thesis proposal and its oral defense to the student's committee, prior to enrolling in 500.
2. Successful completion of 30 hours of graduate credit, which must include 6 hours of 500. At least 14 of these hours must be at the 500 level or above.
3. Preparation of a written thesis and its oral defense

Non-Thesis Option:

1. Successful completion of 34 hours of graduate credit, which must include 2-4 hours of 503. At least 22 of these hours must be at the 500 level or above.
2. Completion of a project and preparation of a written report summarizing the project.
3. Passing written and oral examinations covering the project and coursework.

Plant and Soil Sciences

Thesis Option: A written thesis based on original research is required. A graduate advisory committee will be assembled at the beginning of the student's program. The committee consists of the major professor, who acts as chair of the committee, and at least two other faculty members. Prior to conducting research, the student must develop a detailed written research proposal that shall be approved by the student's committee. Upon completion of the thesis, this committee will also conduct the final oral examination that integrates the thesis and coursework.

Six hours of Plant and Soil Sciences 500 Thesis are required. In addition to the thesis hours, a minimum of 24 hours of graduate coursework is required. At least 14 of these hours must be taken in courses numbered 501 and above. The student must take at least 12 of the 24 hours in Plant and Soil Sciences courses, excluding 500. The student's committee may require additional coursework beyond the 24 hours if the student's progress or background indicates a need or deficiency. All students pursuing the M.S. degree must take Plant and Soil Sciences 503 Seminar (1 hr) and 511 Soil-Plant Relations (3 hrs). The student must also present an exit seminar to the Department over the research project.

All students pursuing a concentration in soil science must also take at least three of the following courses: Plant and Soil Sciences 512, 513, 514, and 516. All students concentrating in plant breeding and genetics or in crop physiology and ecology must take two of the following courses: Plant and Soil Sciences 532, 551, and 553.

A student who has started a degree under the thesis option is not eligible to transfer to the non-thesis option after the end of the first semester of graduate studies or after receiving a graduate assistantship stipend for more than one semester. A student who has started under the non-thesis option may transfer to the thesis option upon approval of a potential major professor and the department head.

Non-Thesis Option: A student desiring the non-thesis option should declare this intention at the beginning of the first semester of graduate studies, and must

declare it before the beginning of the second semester. In lieu of a thesis, students are required to complete three hours of Plant and Soil Sciences 593 for satisfactory participation in a single research program for a period of 12 weeks and the writing of an original, creative, and well-written report.

A graduate advisory committee will be assembled at the beginning of the student's program. The committee consists of the major professor, who acts as chair of the committee, and at least two other faculty members. This committee approves the student's plan of study and the participation and report on research activity from 593. In addition, this committee administers and evaluates a comprehensive written examination that serves to integrate the student's coursework.

In addition to three hours of Plant and Soil Sciences 593, a minimum of 30 hours of graduate coursework is required. At least 20 hours must be taken in courses 501 or above. The student must also take at least 12 of the 30 hours in Plant and Soil Sciences courses, excluding Thesis 500. The student's committee may require additional coursework beyond the 30 hours if the student's progress or background indicates a need or deficiency. All students must take Plant and Soil Sciences 503 Seminar (1 hr) and 511 Soil-Plant Relations (3 hrs).

All students pursuing a concentration in soil science must also take at least three of the following courses: Plant and Soil Sciences 512, 513, 514, and 516. All students pursuing a concentration in plant breeding and genetics or in crop physiology and ecology must take two of the following courses: Plant and Soil Sciences 532, 551, and 553.

THE DOCTORAL PROGRAM

A minimum of 72 hours beyond the Bachelor's degree, exclusive of credit for Thesis 500, is required. Of this number, 24 hours must be Doctoral Research and Dissertation 600. A minimum of 26 hours must be completed in courses numbered above 500 exclusive of doctoral research and dissertation, of which 6 must be in courses numbered above 600. A minimum of 9 hours of graduate course work taken during the doctoral program must be outside the major in one or more cognate areas. Major courses include those in: Plant and Soil Sciences, Environmental and Soil Sciences, Integrated Plant Systems, Ornamental Horticulture and Landscape Design, and Plant Sciences and Landscape Systems.

The student and the major professor identify a doctoral committee composed of at least four faculty members holding the rank of assistant professor or above, three of whom, including the chair, must be approved by the Graduate Council to direct doctoral research. At least one member must be from outside the department. The committee must approve all coursework applied toward the degree, certify the student's mastery of the major field and an cognate fields, direct the research, and recommend the dissertation for approval and acceptance by Graduate Student Services.

See the Department of Biosystems Engineering and Environmental Science for

additional details and additional major courses offered.

Integrated Plant Systems

GRADUATE COURSES

431 Physiology and Ecology in Agroecosystems (3) Plant physiology and ecology applied to crop production and management. Plant physiology and ecology principles related to crop production practices from seeding to harvesting and handling. Interaction of crops with environment and sustainable agroecosystems. Prereq: Crop science. 2 hrs and 1 2-hr lab. F

433 Agricultural Pesticides (3) Regulation of pesticide development, manufacture, transportation, marketing and use. Structure, use, mode of action, degradation and environmental impact of pesticides used in agriculture, forestry and related areas. Prereq: 1 yr biological sciences and 1 semester chemistry. 2 hrs and 1 lab. Sp

434 Fruit and Vegetable Crops (3) Principles of production systems to counter environmental stresses and to increase productivity of warm and cool season vegetable crops, small fruit crops, and deciduous tree fruit crops. Storage of crops after harvest. Prereq: 230 Introduction to Crop Science. 2 hrs and 1 2-hr lab. F

435 Field and Forage Crops (3) Agronomic principles of crop production and management. Crop improvement, cropping systems, tillage, fertilization, pest management, harvest and utilization of major field and forage crops. Prereq: 230 Introduction to Crop Science. 2 hrs and 1 lab. Sp

440 Advanced Turfgrass Management (4) Principles and scientific basis of turfgrass culture: adaptation, ecology, physiology, soil fertility, and grass nutrition, climatic influences on grass culture; physiology of clipping and water management; design, construction, and management of golf courses; and physiological influences of pest infestation and control measures. Prereq: 340 Turfgrass Management or consent of instructor. 3 hrs and 1 lab. Sp

453 Principles of Plant Breeding (3) Genetic principles and techniques used in crop improvement. Consideration of breeding methods for various types of plant reproduction systems and application. Discussion of heritability estimation, genetic advances through selection and theory upon which breeding methods are based. Prereq: Plant Sciences and Landscape Systems 471 and general genetics. 2 hrs and 1 2-hr lab. Sp,A

Ornamental Horticulture and Landscape Design

GRADUATE COURSES

410 Nursery Management and Production (3) Modern management methods as applied to retail and wholesale nurseries and landscape contracting firms. Methods of producing liners, container and field-grown woody ornamental plants. Prereq: 220 Basic Landscape Plants, 330 Plant Propagation, and Environmental and Soil Sciences 210 Introduction to Soil Science, or consent of instructor. 2 hrs and 1 lab. Sp

427 Management and Administration of Public Horticulture Institutions (3) Management of resources in non-profit institutions, support organizations and communities. Theoretical framework and institutional mission; strategic planning and programming; financial accounting and budgeting; development and fund raising; personnel policies; volunteer development; marketing and publicity; legal issues; relationships between staff and governing boards; the use of information technology in management and governance systems; and conservation/preservation roles in community development. Prereq: 326 Public Horticulture. F

429 Field Study of Public Horticulture Institutions (3) Extended 10 -12 day field study of various public horticulture institutions: botanical gardens, arboreta, historical grounds, zoos, conservatories, cemeteries, and nature preserves. Travel journal and course portfolio required. Prereq: 326 Public Horticulture. Application and travel fee required. Sp

435 Public Garden Operations and Management (3) Analysis of year-round operations and management of public gardens. Case studies: time and labor management, budget development and management, implementation of volunteer programs, information dissemination methods for public outreach, management of grounds and facilities using the University of Tennessee Institute of Agriculture Gardens as model. Prereq: 326 Public Horticulture. Sp,A

436 Plant and Garden Photography (2) Principles and techniques of photography related to plants and gardens. Equipment options and field shooting under various weather conditions and in different seasons. Prereq: Senior standing and consent of instructor. Sp,A

446 Horticultural Therapy (3) Application of horticulture as therapy for treatment, rehabilitation and/or training of individuals with disabilities. Prereq: Senior standing and consent of instructor. A

450 Specialty Landscape Construction (3) Methods of design, materials, and construction techniques for specialized components of landscape industry. Irrigation systems, outdoor lighting, garden ponds and water features. Prereq: 350 Basic Landscape Construction. F

451 Plant Tissue Culture (3) (Same as Botany 451.)

460 Professional Practices in Landscape Construction and Management (2) Professionalism, salesmanship, proposals, bidding, estimating, specification, and contract management in landscape services industry. Interaction with industry representatives through special presentations. Prereq: 350 Basic Landscape Construction or consent of instructor. F

480 Advanced Landscape Design (3) Comprehensive application of landscape design skills to variety of project experiences: landscape planning and analysis, planting design, and materials estimating. Prereq: 280 Fundamentals of Landscape Design and 380 Supplemental Landscape Design Graphics. 2-3-hr labs. Sp

485 Computer Aided Landscape Design (3) Computer Aided Design (CAD) related to landscape design and construction. Site planning and construction of related landscape plan view and 3-D drawings. Operating system, use of Autocad and LANDCADD software. Prereq: 280 Fundamentals of Landscape Design, 380 Supplemental Landscape Design Graphics, Agriculture and Natural Resources 290 Computer Applications to Problem Solving. 2 3-hr labs. F, Sp

494 Professional Horticultural Communications (3) Communication for public horticulturists through written, oral and visual media. Communication skills using proper writing techniques and grammar for print media, brochure design using desktop publishing, slide show development, oral presentations, and video use for educational and informational presentations in ornamental horticulture. Prereq: Agriculture and Natural Resources 290 Computer Applications to Problem Solving and senior standing.

500 Thesis (1-15) P/NP only. E

501 Special Topics in Ornamental Horticulture and Landscape Design (1-3) Topics to be assigned. May be repeated. Maximum 6 hrs. Prereq: Consent of instructor. E

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

503 Non-Thesis Project (1-2) Library, field, or laboratory project under supervision of faculty member. Not for thesis candidates. May be repeated. Maximum 4 hrs. E

507 Professional Development Seminar (1) (Same as Agriculture and Natural Resources 507, Animal Science 507, Biosystems Engineering 507, Biosystems Engineering Technology 507, Food Science and Technology 507, and Plant and Soil Sciences 507.) S/NC only. F

nology 507, and Plant and Soil Sciences 507.) S/NC only. F

511 Plant Disease Fungi (4) (Same as Entomology and Plant Pathology 510.)

521 Flowering Physiology (1) General phenomenology, photoperiodism, thermoperiodism, interactions of external factors, juvenility, and hormonal regulation. Prereq: Introductory plant physiology or equivalent. 3 hrs weekly for 5 weeks. Sp,A

522 Stress Physiology (1) Introduction to abiotic plant stress physiology: drought, flooding, salinity, light, pollutants, other stresses. Prereq: Introductory plant physiology or equivalent. 3 hrs weekly for 5 weeks. Sp,A

523 DNA Analysis (1) Practical experience in isolating Genomic DNA from plants and fungi, amplification of DNA using arbitrary oligonucleotide primers. DNA profiling techniques (DAF, ASAP) isolation and purification of amplified products. Data analysis of relationships between organisms. Prereq: 8 hrs biological/botanical sciences, 8 hrs chemistry, consent of instructor. 1 hr and 4 labs weekly for 5 weeks. Sp,A

524 Protein Gel Electrophoresis (1) Practical experience with isolating native and denatured proteins from plants and fungi determining protein concentrations, PAGE of proteins including total proteins and assays for specific enzymes (isozyme) analyses. Prereq: 8 hrs biological/botanical sciences, 8 hrs chemistry, consent of instructor. 1 hr and 4 labs weekly for 5 weeks. Sp,A

525 Plant Microtechnique (1) Practical light and scanning electron microscopy methods for investigating aspects of plant development, histochemistry and pathological structures in ornamental forest and crop species. Prereq: 8 hrs biological/botanical sciences and consent of instructor. 1 hr and 4 labs weekly for 5 weeks. Sp,A

590 Seminar (1) Presentations and discussion of topics. May be repeated. Maximum 2 hrs. E

592 Internship (1-2) Application of horticulture and design principles and practices in supervised, professional setting, approved by department. S/NC or letter grade. E

593 Problems in Ornamental Horticulture and Landscape Design (1-3) Independent study. Current topic related to technology, science or design. May be repeated. Maximum 6 hrs. E

Plant and Soil Sciences

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E

501 Seminar Preparation (1) Application of speaking, writing, and organizational skills in preparation and presentation of scientific material to both scientific and general audiences. Preparation of abstracts for scientific presentations. Required of all entering graduate students during their first year of graduate study. F

502 Registration for Use of Facilities (3-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

503 Seminar (1) Presentations and discussion of current scientific material. May be repeated. Maximum 3 hrs. F,Sp

507 Professional Development Seminar (1) (Same as Agriculture and Natural Resources 507, Animal Science 507, Biosystems Engineering 507, Biosystems Engineering Technology 507, Food Science and Technology 507, and Ornamental Horticulture and Landscape Design 507.) S/NC only. F

511 Soil-Plant Relationships (3) Principles of mineral nutrition of higher plants: plant physiological characteristics that influence uptake of water and nutrients; functions of nutrient elements in plants; soil factors influencing nutrient availability to plants; important relationships at soil-plant root interface; and responses

to adverse soil environmental conditions. Prereq: Environmental and Soil Sciences 434 or Integrated Plant Systems 431 or general plant physiology. 3 hrs and 1 rec. F,A

512 Pedology (3) Physical and chemical weathering processes, factors of soil formation, soil forming processes. Prereq: Environmental and Soil Sciences 442 or consent of instructor. 2 hrs and 1 lab. Sp,A

513 Advanced Soil Chemistry (3) Chemical properties and processes that operate in soil environment: thermodynamics of soil solutions and surface chemistry of soils, soluble complex formation, mineral solubility, electrochemical equilibria, geochemical modeling, ion exchange equilibria, surface functionality and reactivity, adsorption phenomena, and surface complexation modeling. Prereq: Environmental and Soil Sciences 434 or consent of instructor. Sp,A

514 Advanced Soil Physics (3) Theory and mathematical modeling of flow and solute transport in saturated-unsaturated soil: geostatistical analysis of soil heterogeneity, stochastic properties multi-scale pore processes, anisotropy, hysteresis. Analytical, and numerical solution of flow and transport equations for unsaturated zone. Prereq: Calculus III, Environmental and Soil Sciences 444, or consent of instructor. Sp,A.

516 Soil Biology and Biochemistry (3) Soil organisms and their activities in soils: soil ecology, biogeochemical cycling of important elements, organic matter dynamics, and applications of agricultural and environmental biology and biochemistry. Prereq: Soil science. 2 hrs and 1 3-hr lab. F,A

530 Integrated Pest Management (3) (Same as Entomology and Plant Pathology 530.) F,A

532 Environmental Crop Physiology and Ecology (3) General and specific relations among environmental factors, crop organisms, and agricultural systems. Interrelationships of atmospheric gases in photosynthesis, evapotranspiration and foliar injury. Relationships of temperature stress, vernalization and bud dormancy to crop production. Influences of maturation ripening and senescence on post-harvest quality of fruit, vegetable, grain and forage crops. Prereq: Integrated Plant Systems 431. 2 hrs and 1 lab. Sp,A

536 Ecology of Grazing Land Systems (3) Multi-university, field-oriented course. Components and functions of grazing lands and how these vary in different ecoregions; research needs, objectives and techniques in soil-plant-animal research; forage-livestock ecology and systems in grazing lands (cropland, pastureland, rangeland and forestland); role of forages in conservation practices, wildlife habitats, and sustainable agriculture; and industries involved with forages and livestock. Two-week field trip, inclusive report and examination. Prereq: Consent of instructor. Su

551 Organismal Plant Genetics (3) Discovery of genetics, polyploidy, extrachromosomal inheritance, apomixis, incompatibility systems, mutations, controlling elements, quantitative inheritance and heritability. Prereq: General genetics, Plant Sciences and Landscape Systems 471 or equivalent, F,A

553 Plant Breeding Technologies (3) Principles and methodologies targeting genetic gain for crop improvement. Concepts of qualitative and quantitative trait improvement. Parental germplasm, population formation, hybridization, inbreeding, genetic variance, heritability, genetic gain, concepts and applications of molecular genetic markers to identify superior germplasm for increased selection efficiency. Prereq: Plant Sciences and Landscape Systems 471 and general genetics. Sp,A

571 Design and Analysis of Biological Research (3) (Same as Animal Science 571.) Sp

593 Special Problems in Plant and Soil Science (1-3) May be repeated. Maximum 6 hrs. E

600 Doctoral Research and Dissertation (3-15) P/ NP only. E

601 Special Topics in Soil Science (1-3) Thermodynamics of soil solutions, clay structure and surface chemistry, soil mineralogy, plant mineral nutrition, soil microbiology, water movement and use by plants, soil structure, soil thermal properties,

interaction in the soil-plant environment. May be repeated. Maximum 6 hrs. E

603 Special Topics in Crop Physiology and Ecology (1-3) Microclimatology of agroecosystems, crop dormancy and responses to stress, physiology of crop growth and reproduction. Interactions of physiology and germplasm in crop production, theory and application of quantitative methods in crop physiology and ecology research. May be repeated. Maximum 6 hrs. E

605 Special Topics in Plant Breeding and Genetics (1-3) Genotype by environment interactions, estimation of quantitative parameters, mutations, chromosome dynamics, polyploidy, genetic engineering, interspecific hybridization, linkage, screening methods, genome organization. May be repeated. Maximum 6 hrs. E

613 Advanced Topics in Soil Chemistry and Fertility (2) Topics of current significance; scientific literature. Prereq: 513 or equivalent. Sp,A

614 Advanced Topics in Soil Biology and Biochemistry (2) Topics of current significance; scientific literature. Prereq: 516 or equivalent. F,A

615 Advanced Topics in Soil Physics, Genesis, and Morphology (2) Topics of current significance; scientific literature. Sp,A

633 Plant Metabolism (3) Metabolism of chemical compounds of economic importance in crop production: plant growth regulators, naturally occurring plant metabolites, and herbicides. Prereq: Botany 521 or 522 and organic chemistry or biochemistry. Sp,A

653 Advanced Plant Breeding (4) Development and utilization of concepts of quantitative parameters, inbreeding, heterosis, methods of selection, in vitro breeding, interspecific hybridization, stability parameters, genetic resistance and vulnerability to pests and environmental stresses. Prereq: 571 and Integrated Plant Systems 453 or equivalent or consent of instructor. 3 hrs and 1 lab. Sp,A

Plant Sciences and Landscape Systems

GRADUATE COURSES

471 Statistics for Biological Research (3) Application of statistics to interpretation of biological research. Notation, descriptive statistics, probability, distributions, confidence intervals, t and chi-square tests, analysis of variance, mean separation procedures, linear regression and correlation. Prereq: Calculus. F

Political Science

(College of Arts and Sciences)

MAJORS	DEGREES
Political Science	M.A., Ph.D.
Public Administration	M.P.A., J.D.-M.P.A.

Patricia Freeland, *Head*

Professors:

Cunningham, Robert B., Ph.D. Indiana
 Fitzgerald, Michael R., Ph.D. Oklahoma
 Freeland, Patricia K.,
 Ph.D. Wisconsin (Milwaukee)
 Gant, Michael M., Ph.D. Michigan State
 Gorman, Robert A., Ph.D. New York
 Lyons, William, Ph.D. Oklahoma
 Plaas, Hiram, Ph.D. Utah
 Scheb, John M., II, Ph.D. Florida
 Smith, T. Alexander, Ph.D. Ohio State

Stephens, Otis H. (Distinguished Prof.),
 Ph.D. Johns Hopkins
 Unga, Thomas D. (Emeritus), Ph.D. Iowa
 Welborn, David M. (Emeritus), Ph.D. Texas

Associate Professors:

Folz, David H. (Liaison), Ph.D. Tennessee
 Houston, David J., Ph.D. . SUNY (Binghamton)
 Kelly, Janet, Ph.D. Wayne State
 Nownes, Anthony J., Ph.D. Kansas
 Peterson, Robert L., Ph.D. Yale
 Zhong, Yang (Liaison), Ph.D. Kentucky

Assistant Professors:

Caprioli, Mary, Ph.D. Connecticut
 Carcieri, Martin,
 Ph.D. California (Santa Barbara)
 Lipinski, Daniel, Ph.D. Duke
 Van Cott, Donna, Ph.D. Georgetown

The Department of Political Science offers the M.A., M.P.A., and Ph.D. The department also offers a dual program with the College of Law. Inquiries concerning all programs should be directed to the departmental office.

ADMISSION REQUIREMENTS

Three departmental recommendation forms must be submitted to the Office of Graduate Admissions, at least two of which must be completed by instructors at the institution most recently attended. In addition, scores on the general portion of the Graduate Record Examination must be submitted.

THE MASTER OF ARTS PROGRAM

A Bachelor's degree or its equivalent is required for admission. Normally an overall average of 3.0 is also required together with an average of 3.2 in the last two years of political science or social science. In addition, a composite score of at least 1100 on the verbal and quantitative parts of the GRE is normally required.

Students pursuing the Master of Arts degree may follow one of two options:

Thesis Option: (30 hours) Coursework, preparation of a thesis, and an oral examination on coursework and the thesis, is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and either 511 or 512). Six hours may be earned through thesis credit.

Non-Thesis Option: (36 hours) Coursework, plus a written comprehensive examination on all coursework is required. At least 12 of these hours must be in political science, with 6 in the field of methodology (Political Science 510 and either 511 or 512), and 3 hours in the 600-level research seminar in the student's first field of interest.

THE MASTER OF PUBLIC ADMINISTRATION PROGRAM

The M.P.A. program is intended to prepare students for public service careers by acquainting them with management principles, analytical tools, and the ethical dilemmas they will face as public administrators. It consists of a total of 39 semester hours, including a core program, an elective specialization and a recommended internship.

Applicants for admission to the program must have a Bachelor's degree or its equivalent. Normally, an overall average of 3.0 and an average of 3.2 in the last two years of political science or social science courses is required. In addition, a composite score of 1100 on the verbal and quantitative parts of the GRE is desired.

Students must demonstrate proficiency in the use of software applications on the personal computer. This requirement can be fulfilled by achieving a satisfactory grade in Political Science 596, Workshops in Computer Applications. Exceptions to this requirement will be considered on an individual basis.

The M.P.A. is a non-thesis program requiring 39 hours. Specific requirements include the following:

1. Core Curriculum (24 hours)
 - a. General perspectives (9 hours) - 550 Public Administration; 552 Organization Theory; and any one of the following: 442 Administrative Law; 539 State and Local Government; 540 Public Law; 548 Public Policy Process; 558 The Politics of Administration; or 566 Ethics, Values, and Morality in Public Administration.
 - b. Analytical skills (6 hours) - 512 Quantitative Political Analysis; 514 Research and Methodology in Public Administration.
 - c. Management skills (9 hours) - 560 Public Budgeting and Finance; and any two of the following: 562 Public Management; 564 Human Resources Management; 556 Policy Analysis.
2. Specialization (9 hours)

A specialization is designed by the student in consultation with the coordinator of the M.P.A. degree program. Possible specializations include general government, public health, budgeting and finance, planning, natural resources, program evaluation, criminal justice, public relations, personnel, and others.

3. Recommended Internship (6 hours)
Internships are arranged in consultation with the coordinator of the M.P.A. degree program.

4. Final Examination

A written final examination, which may be followed by an oral examination, is required.

DUAL J.D.-M.P.A. PROGRAM

The College of Law and the Department of Political Science in the College of Arts and Sciences offer a coordinated dual degree program leading to the conferral of both the Doctor of Jurisprudence and Master of Public Administration degrees. In this program, a student may earn the M.P.A. and J.D. degrees in about four years rather than the five years that otherwise would be required. Students pursuing the dual degree program should plan to be enrolled in coursework or an internship for one summer term in addition to taking normal course loads for four academic years.

Admission

Applicants for the J.D.-M.P.A. program must make separate application to, and be independently accepted by, the College of Law for the J.D. degree and the Department of Political Science and the Office of Graduate Admissions for the M.P.A. degree. Applicants must also be accepted by the

Dual Degree Committee. All applicants must submit a Law School Admission Test (LSAT) score. An applicant's LSAT score may be substituted for the Graduate Record Examination (GRE) score, which is normally required for admission to the M.P.A. program. Application may be made prior to or after matriculation in either the J.D. or the M.P.A. program, but application to the dual program must be made prior to entry into the last 29 semester hours required for the J.D. degree and prior to entry into the last 15 hours required for the M.P.A. degree.

Curriculum

A dual degree candidate must satisfy the requirements for both the J.D. and the M.P.A. degrees, as well as the requirements for the dual program. The College of Law will award a maximum of 9 semester hours of credit toward the J.D. degree for successful completion of approved graduate level courses (500 or 600 level) offered in the Department of Political Science. The M.P.A. program will award a maximum of 9 semester hours of credit toward the M.P.A. degree for successful completion of approved courses offered in the College of Law. All courses for which such cross-credit is awarded must be approved by the J.D.-M.P.A. coordinators in the College of Law and the Department of Political Science. All candidates for the dual degree must successfully complete Administrative Law (Law 821). An internship is strongly recommended for students in the dual degree program, as it is for all M.P.A. candidates, but an internship is not required.

During the first two years in the dual program, students will spend one academic year completing the required first year of the College of Law curriculum and one academic year taking courses solely in the M.P.A. program. During those first two years, students may not take courses in the opposite area, without the approval of the J.D.-M.P.A. coordinators in both academic units. In the third and fourth years, students are strongly encouraged to take both law and political science courses each semester.

Dual degree students who withdraw from the program before completion of the requirements for both degrees will not receive credit toward either the J.D. or the M.P.A. degree for courses taken in the other program except as such courses qualify for credit without regard to the dual program.

Awarding of Grades

For grade recording purposes in the College of Law and the Department of Political Science, grades awarded in courses in the other unit will be converted to either Satisfactory or No Credit and will not be computed in determining a student's GPA or class standing. The College of Law will award a grade of Satisfactory for an approved M.P.A. course in which the student earns a grade of B or higher and a grade of No Credit for any lower grade. The Political Science Department will award a grade of Satisfactory for an approved law course in which the student earns a grade of 2.3 or higher and a grade of No Credit for any lower grade. The official academic record of the student maintained by the Registrar of the University shall show the actual grade

assigned by the instructor without conversion.

THE DOCTORAL PROGRAM

The Ph.D. program prepares students for careers in college teaching, as well as careers in other occupations related to service in the public or private sectors. Applicants for admission to the program should normally have completed a master's degree in political science or a related field with a 3.5 GPA and have earned a composite score of at least 1100 on the verbal and quantitative parts of the Graduate Record Examination.

Doctoral students admitted to the program must complete 84 hours beyond the bachelor's degree, including 24 hours of coursework beyond the master's degree, graded A-F, must successfully pass written comprehensive examinations in two broad subfields of political science, and must pass a final oral examination on the dissertation.

In addition, students must satisfy a research tool requirement. Usually, students meet this requirement by completing 12 hours of coursework numbered above 500 in empirical theory and research methodology. However, if a student's advisor and program committee certify that competency in a foreign language is a more appropriate research tool, a foreign language can be used instead.

In addition to the total hours required for the degree, the following requirements must also be met:

1. At least 69 hours must be in political science courses.
2. At least 54 hours in political science must be in courses numbered above 500.
3. Completion of Political Science 510, 511, and 512.
4. Completion of at least three courses or seminars at UT in each of the two broad subfields in which the students take examinations.
5. Completion of at least one course or seminar in each of the five broad subfields available for graduate instruction in the department.
6. At least 6 hours must be earned in political science courses numbered above 600.
7. A total of 24 hours must be earned by writing the dissertation.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

GRADUATE COURSES

430 United States Constitutional Law: Sources of Power and Restraint (3) Analysis of judicial review, constitutional powers of President and Congress, federalism, sources of regulatory authority, and constitutional protection of political and economic rights. (Same as Legal Studies 430.)

431 U.S. Constitutional Law: Civil Rights and Liberties (3) Analysis of current issues in civil rights and liberties including: first amendment freedoms, equal protection, privacy and rights of accused. (Same as Legal Studies 431.)

- 435 Criminal Law and Procedure (3)** Substantive and procedural law in criminal justice field: constitutional questions and public policy issues.
- 441 Public Budgeting (3)** Process, participants, and politics of government budgeting: federal government budgeting. Overview of budget reform measures and their effectiveness.
- 442 Administrative Law (3)** Legal dimensions of administrative power and procedures, and constitutional controls over administrators. (Same as Legal Studies 442.)
- 451 Ethnic Conflict in Foreign Countries (3)** Examination of political and violent conflict among ethnic and national groups and challenges these conflicts pose for democratic and democratizing states.
- 452 Black African Politics (3)** Recent evolution and current political environment of Black African nations. (Same as Afro-American Studies 452.)
- 454 Government and Politics of China and Japan (3)** Examination of the political setting, structure and political processes in China and Japan.
- 456 Latin American Government and Politics (3)** Political development of Latin America: contemporary politics. (Same as Latin American Studies 456.)
- 459 Government and Politics of the Soviet Union (3)** Origins and development of Soviet political system, and study of selected policy areas.
- 461 Policy Making in Democracies (3)** Comparative approach to theory and process of making public policies.
- 463 Contemporary Middle East Politics (3)** Governments and movements in Middle East, their characteristics, bases, and interrelationships.
- 470 International Law (3)** Nature and development of international law and compliance. Function of international law in context of international conflict. (Same as Legal Studies 470.)
- 471 International Political Economy (3)** Economic relations between countries; theoretical and case studies of efforts to construct multilateral international institutions. Topics: economic growth, international trade and investment, development and global equity.
- 475 Ancient and Medieval Political Thought (3)** Survey of major western political thinkers from Socrates to Marsilio of Padua.
- 476 Modern Political Thought (3)** Survey of major western political thinker from Machiavelli to Marx.
- 500 Thesis (1-15)** P/NP only. E
- 502 Registration for Use of Facilities (1-15)** Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E
- 510 Scope and Methods in Political Science (3)** Procedures of analysis in political science.
- 511 Research Design (3)** Methods for planning and executing research, from case studies to experimental designs: development of research questions and hypotheses; measurement issues; and validity of inferences.
- 512 Quantitative Political Analysis (3)** Methods and techniques in quantitative political analysis: univariate and bivariate statistics.
- 513 Quantitative Political Analysis (3)** Methods and techniques in quantitative political analysis: multivariate model building.
- 514 Research and Methodology in Public Administration (3)** Basic assumptions and techniques of research in public administration; measurement, analysis, and reporting of data.
- 520 Political Theory (3)** Survey of major ideas, thinkers and works of Western political theory.
- 522 American Political Thought (3)** Systematic examination of the normative and empirical theories of leading American political thinkers from the colonial period to the present.
- 530 American Government and Politics (3)** Survey of literature, approaches to research and analysis, critical examination of major works, and overviews of research in various subfields. May be repeated with consent of department. Maximum 9 hrs.
- 532 Presidency (3)** Systematic examination of the structure, functions and powers of the American presidency as they have evolved from the founding to the present.
- 533 Congress (3)** Formal, empirical and theoretical approaches to and models of the institutional workings of Congress and the behavior of legislators.
- 535 Mass Political Behavior (3)** Theoretical and empirical analyses of public opinion, political socialization, political attitudes and behavior, especially voting behavior.
- 537 Political Parties and Interest Groups (3)** Theoretical and empirical examination of the structure, functions and operations of political parties and interest groups.
- 539 State and Local Government and Politics (3)** Theoretical and empirical analysis of government, politics, policymaking and public administration at the state and local levels.
- 540 Public Law (3)** Selective examination of published research and current approaches in subfields of constitutional law, judicial process, and judicial behavior. May be repeated with consent of department. Maximum 9 hrs.
- 548 Public Policy Process (3)** Theoretical, formal and empirical analysis of the roles, functions and decision making processes of public policymakers, including legislative, executive and judicial actors.
- 550 Public Administration (3)** Overview of public administration theory and function.
- 552 Organization Theory (3)** Appraisal of major theories of organization and their applicability to public sector.
- 556 Policy Analysis (3)** Strategies and techniques for identification and analysis of public problems and policy solutions. May be repeated with consent of department. Maximum 9 hrs.
- 558 The Politics of Administration (3)** Examination of public administration in context of American political system, policy making and political roles of public administrators and agencies. May be repeated with consent of department. Maximum 9 hrs.
- 560 Public Financial Administration (3)** Principles and techniques of public finance at state and local levels: budget preparation, execution and audit, risk management, capital planning, major tax structures, economic forecasting, cash management, and debt administration.
- 562 Public Management (3)** Interpersonal and leadership skills, techniques and methods for planning, decision making, and implementation of management strategies in public sector. May be repeated with consent of department. Maximum 9 hrs.
- 564 Human Resource Management in Public Organizations (3)** Intensive analysis of contemporary issues, challenges, methods and strategies related to effective management of human resources in public sector.
- 566 Ethics, Values, and Morality in Public Administration (3)** Moral-ethical-value dilemmas confronting administrators in American political system.
- 569 Internship in Public Administration (3-9)** Open to students participating in approved internship programs. May be repeated with consent of department. Maximum 9 hrs. S/NC only.
- 570 Comparative Government and Politics (3)** Selected topics in modern governments. May be repeated with consent of department. Maximum 9 hrs.
- 572 The Politics of Development (3)** Selected topics dealing with political problems of less developed countries. May be repeated with consent of department. Maximum 9 hrs.
- 574 Area Seminar in Comparative Government and Politics (3)** Selected topics in area studies: African, Asia, Latin America, Middle East, Soviet Union and Eastern Europe or Western Europe. May be repeated with consent of department. Maximum 9 hrs.
- 580 International Politics (3)** Survey of literature and major aspects of international politics. May be repeated with consent of department. Maximum 9 hrs.
- 591 Foreign Study (1-15)** See College of Arts and Sciences.
- 592 Off-Campus Study (1-15)** See College of Arts and Sciences.
- 593 Independent Study (1-15)** See College of Arts and Sciences.
- 594 College Teaching in Political Science (1)** Instructional effectiveness, techniques, organization, materials for teaching political science at college level. Prereq: Consent of instructor. S/NC only.
- 595 Readings and Special Problems in Political Science (1-3)** Prereq: Consent of instructor. May be repeated. Maximum 15 hrs.
- 596 Workshops in Computer Applications (1)** Training in software applications to support research and decision making tasks in public service. Successful completion certifies proficiency of MPA students in use of software applications for personal computer. S/NC only.
- 600 Doctoral Research and Dissertation (3-15)** P/NP only. E
- 610 Special Topics in Empirical Theory and Methodology (3)** Advanced methods and procedures of analysis in political science. May be repeated with consent of department. Maximum 9 hrs.
- 615 Formal Political Analysis (3)** Assumptions, methods and applications of formal political models, including game theory, rational choice theory, and public choice theory, and mathematical modeling. May be repeated with consent of instructor. Maximum 9 hrs.
- 628 Topics in Political Theory (3)** Selected issues and problems in normative political theory. Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.
- 639 Special Topics in American Government and Politics (3)** Advanced study of selected topics. May be repeated with consent of instructor. Maximum 9 hrs.
- 640 Special Topics in U.S. Constitutional Law (3)** Systematic analysis of published research and judicial decision: development of constitutional law as major component of public policy. May be repeated with consent of department. Maximum 9 hrs.
- 654 Contemporary Public Policies (3)** Problems in one or more public policy areas from political and administrative perspectives. Topics selected by instructor. May be repeated with consent of department. Maximum 9 hrs.
- 660 Contemporary Perspectives on Public Administration (3)** Development of theory in public administration: contemporary critiques and alternatives. May be repeated with consent of instructor. Maximum 9 hrs.
- 668 Special Topics in Public Administration (3)** Analysis of selected issues and problems in public administration. May be repeated. Maximum 9 hrs.
- 670 Special Topics in Comparative Government and Politics (3)** Research into selected topics. May be repeated with consent of department. Maximum 9 hrs.
- 682 Theory and Analysis of U.S. Foreign Policy Processes (3)** Theoretical approaches to decision making in foreign policy area and analysis of policymaking process. May be repeated with consent of department. Maximum 9 hrs.
- 688 Special Topics in International Politics (3)** Selected issues and problems in international politics. Specific content determined by instructor. May be repeated with consent of instructor. Maximum 9 hrs.

Polymer Engineering

See *Materials Science and Engineering*

Psychology

(College of Arts and Sciences)

MAJOR	DEGREES
Psychology	M.A., Ph.D.

James E. Lawler, *Head*

Professors:

Burghardt, Gordon M. (Distinguished Prof.), Ph.D.	Chicago
Calhoun, William H. (Emeritus), Ph.D.	California
Fine, Harold J. (Emeritus), Ph.D.	Syracuse
Handel, Stephen J., Ph.D.	Johns Hopkins
Handler, Leonard, Ph.D.	Michigan State
Jones, Warren H., Ph.D.	Oklahoma State
Lawler, James E., Ph.D.	North Carolina
Lawler, Kathleen A., Ph.D.	North Carolina
Lounsbury, John W., Ph.D.	Michigan State
Lubar, Joel F., Ph.D.	Chicago
Malone, John C., Ph.D.	Duke
Nash, Michael R., Ph.D.	Ohio
Newton, Kenneth R. (Emeritus), Ph.D.	Tennessee
Pollio, Howard R. (Distinguished Prof.), Ph.D.	Michigan
Samejima, Fumiko, Ph.D.	Keio
Saudargas, Richard A., Ph.D.	Florida State
Shrader, Raymond R. (Emeritus), Ph.D.	Tennessee
Sundstrom, Eric D., Ph.D.	Utah
Travis, Cheryl B., Ph.D.	California (Davis)
Verplanck, William S. (Emeritus), Ph.D.	Brown
Wahler, Robert G. (Liaison), Ph.D.	Washington
Wiberley, J. Albert (Emeritus), Ph.D.	Syracuse

Associate Professors:

Baldwin, Debora R. (Liaison), Ph.D.	Kent State
McIntyre, Anne, Ph.D.	Yale
Morgan, Wesley G., Ph.D.	Tennessee
Welsh, Deborah, Ph.D.	Massachusetts

Assistant Professors:

Gaertner, Lowell, Ph.D.	North Carolina
Gordon, Kristina C., Ph.D.	North Carolina
Hopko, Derek R., Ph.D.	West Virginia

THE MASTER'S PROGRAM

Graduate study leading to the M.A. degree in psychology is available with a concentration in experimental psychology. This program is appropriate for students who desire a master's degree as part of their progress toward a doctorate or for those who wish to complement a degree in a different field.

Admission

Any student with a B.A. or B.S. may apply to the Department of Psychology for admission to the master's program. All students must also submit scores from the

Graduate Record Examination (general and subject).

Major Advisor and Committee

Initially, the Director of Experimental Psychology will advise the student. As soon as possible, the student must select an advisor and obtain his or her approval for registration. Subsequently, the advisor and student will select two additional faculty members to comprise the student's master's committee. Final committee approval comes from the Graduate Dean, upon recommendation by the Department Head.

Program Requirements

All students must complete 32 semester hours of graduate level courses in psychology. These hours must include 515, 521-22, or Statistics 531-32 or an equivalent sequence; 565 or 420; six semester hours of Thesis 500; and twelve hours of 500- or 600-level foundation courses; plus additional graduate level hours to reach the 32-hour requirement. Students must earn a grade of B or better in all courses that are to count toward the 32-hour total. Students must also propose, conduct and successfully defend an original piece of research in the form of a master's thesis.

THE DOCTORAL PROGRAM

A student with a B.A. or B.S. may apply to the Department of Psychology for admission to the doctoral program with a concentration in experimental psychology or clinical psychology. All students must submit scores from the Graduate Record Examination (general and subject).

Experimental Psychology

The Ph.D. program in Psychology with a concentration in experimental psychology is designed to allow students to select from a variety of specializations oriented toward careers in research, teaching, and application of psychology in academic, institutional, or industrial settings. The program is flexible, individualized, and emphasizes a professional apprenticeship model of training.

The basic requirements are:

1. Twelve hours of statistics and research (521-22 or Statistics 531-32 or equivalent and 6 additional hours in research methods or design).
2. Fifteen semester hours in experimental psychology (565 or equivalent and 4 courses from the following: 510, 511 or 512, 513, 543, 546 or 547, 550, 560, and 570 or 571).
3. Six semester hours of research practicum (509).
4. Psychology 528 - preparation for college teaching.
5. Two 600-level graduate seminars.
6. Six semester hours of graduate level courses outside the Psychology Department.
7. Predissertation research project involving the collection of original data or the original analysis of existing data, reported in publishable form and accepted by the student's advisory committee.
8. Comprehensive examination, determined and evaluated by the student's doctoral committee. This examination is comprised of an integrative review or theoretical paper and an oral exam or additional questions.

9. Twenty-four hours of dissertation research (600).

10. An original piece of research in the form of a doctoral dissertation, proposed, conducted, and defended.

Clinical Psychology

This program is designed to lay the groundwork for a career as a clinical psychologist capable of working in both academic and applied settings. The program emphasizes the theoretical foundations of psychology as well as supervised experience oriented toward the development of practical skills. The program embodies a model of clinical psychology in which practice and research are integrated.

Clinical program students must complete a predissertation research project by the end of the second year.

After forming the doctoral committee, students must then pass a comprehensive examination administered and evaluated by the committee. This examination is comprised of two papers, one addressing a topic of the student's choice, and the second addressing an understanding of one individual's personality and cognitive functions. All doctoral students must complete a minimum of 78 hours of graduate level courses, including courses required by their program; at least 6 hours in courses outside of psychology; and at least 24 hours of dissertation research (Psychology 600). Finally, students must complete an acceptable doctoral dissertation and conduct a satisfactory oral defense of the dissertation. Requirements are as follows:

1. Apprenticeship with one faculty member during the first year, two days each week.
2. Predissertation research project completed before forming a doctoral supervisory committee, reported in written form acceptable to two members of the faculty or, if reviewed and accepted for publication or external presentation, by one member of the faculty.
3. Supervised clinical placement two days (16 hours) each week during the second year, and the following option during the third and fourth years:
 - a. continued two day clinical placement in the third and fourth years.
 - b. teaching assistantship in the department in either the third or fourth year and two day clinical placement in the other year.
4. Satisfactory completion of listed courses (or equivalents) in the following sixteen categories:
 - a. Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (513);
 - b. Interviewing and Observation (558) and Laboratory (559);
 - c. Research Practicum (509) (4 hrs.);
 - d. Life-Span Development (512) or Developmental Psychology (511);
 - e. Personality: Theory and Research I and II (570-71);
 - f. History and Systems of Psychology (565);
 - g. Research Questions and Designs (580);
 - h. Psychological Assessment I and II (594-95) and Laboratory (596);

- i. Analysis of Variance for Social Sciences (521) and Multiple Regression for Social Sciences (522);
 - j. Social Psychology (550);
 - k. Field Placement in Clinical Psychology (695) (18 hrs.);
 - l. Dynamics of Psychopathology (573);
 - m. Psychometrics (555) or Applied Psychological Measurement (557);
 - n. Ethical, Legal and Professional Issues in Psychology (635);
 - o. Psychodynamic Psychotherapy I and II (670-71) and Laboratory (673) (4 hrs.);
 - p. Doctoral Research and Dissertation (600) (24 hrs.).
5. Students who choose a teaching assistantship in the third or fourth year must have satisfactorily completed 528 College Teaching in Psychology.
6. Satisfactory completion of a one-year clinical internship at a site approved by the program.

GRADUATE COURSES

- 400 Cognitive Psychology: Language and Symbolic Processes (3)** Psychology of knowing, explaining, and understanding. Directed and associative thinking, memory, problem-solving, and concept-formation. Nature, use, and development of language. Prereq: General Psychology or consent of instructor.
- 409 Group Facilitation (3)** Study of theory and technique through supervised experience in small groups. Prereq: General Psychology or consent of instructor. May be repeated. Maximum 6 hrs.
- 410 Sensory Processes & Perception (3)** Survey of physiological and psychological theories of perception. Audition and vision. Prereq: General Psychology or consent of instructor, Statistics in Psychology or Statistical Reasoning or Introduction to Statistics or graduate standing.
- 415 Psychology of Religion (3)** History of psychology of religion: various philosophical and empirical orientations. Psychological function of religion for individuals and society. Prereq: General Psychology or consent of instructor.
- 420 History and Systems of Psychology (3)** History of psychological thought. Classical approaches and recent developments. Prereq: General Psychology or consent of instructor or graduate standing.
- 424 Psychology and the Law (3)** Psychological aspects of legal systems. Prereq: General Psychology or consent of instructor.
- 430 Health Psychology (3)** Survey of psychological factors related to health and illness: stress, personality, and environment. Applications of psychological treatments to physical illness. Prereq: General Psychology or consent of instructor.
- 434 Psychology of Gender (3)** Biological, psychological, and social factors in gender. Importance of gender roles and stereotypes for behavior and experience. Prereq: General Psychology or consent of instructor. (Same as Women's Studies 434.)
- 440 Organizational Psychology (3)** Social-psychological analysis of organizations, role-theory and systems theory. Prereq: General Psychology and Social Psychology or consent of instructor.
- 445 Measurement and Testing (3)** Theory of test construction and psychological measurement. Statistical methods in measurement. Survey of existing tests. Prereq: General Psychology, Statistics in Psychology or Statistical Reasoning or Introduction to Statistics or consent of instructor.
- 446 Advanced Measurement and Testing (3)** Mental test theories: classical test and item response theories. Prereq: Measurement and Testing.
- 450 Comparative Animal Behavior (3)** (Same as Ecology and Evolutionary Biology 450.)
- 459 Comparative Animal Behavior Laboratory (3)** Coreq: 450. (Same as Ecology and Evolutionary Biology 459.)

461 Physiological Psychology (3) Nervous system and physiological correlates of behavior. Biological basis of emotion, learning, memory and stress. Prereq: General Psychology or consent of instructor and either Biodiversity and Organization and Function of the Cell, or Human Origins and Principles of Biological Anthropology.

470 Theories of Personality (3) Survey of major theories of human personality and their development. Prereq: General Psychology or consent of instructor.

475 Adolescent Development (3) Theoretical perspectives and empirical research findings pertinent to adolescent development. Prereq: General Psychology or consent of instructor. Sp

480 Theories of Learning (3) Classical and current approaches to learning and cognition. Prereq: General Psychology or consent of instructor.

482 Topics in Psychology (3) Intensive analysis of special topics: Afro-American psychology or evaluation of programs in community. Prereq: General Psychology or consent of instructor. May be repeated. Maximum 6 hrs.

489 Supervised Research (1-9) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs in 399, 489, 491, 492, and 493 combined may apply toward undergraduate major.

500 Thesis (1-15) P/NP only. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/N/C only. E

505 Research Design (3) Techniques for planning and conducting research in controlled and natural settings: experiments, quasi-experiments, observational studies, surveys, and program-evaluations. Development of questions and hypotheses for study. Design of studies to maximize validity. Prereq: Consent of instructor. Sp

507 Foundations of Applied Psychology (3) Fundamental methods for application of psychology principles and techniques in community, organizational, and industrial settings, and related ethical and theoretical issues. Prereq: 505 and consent of instructor.

508 Readings and Special Issues in Psychology (1-3) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. E

509 Research Practicum (1-3) Required of first-year graduate students in psychology. May be repeated. Maximum 9 hrs. S/N/C only. E

510 Topics in Psychology (3) Intensive examination of selected issues in psychology. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

511 Developmental Psychology (3) Normal processes of human socialization; physical, cognitive, and emotional development from conception through infancy, childhood, and adolescence. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs. F

512 Life-Span Development (3) Theories and research concerning normal human development throughout life, adulthood and old age. Prereq: Consent of instructor.

513 Foundations of Psychology: Biological Factors, Perception, Learning, Thinking, Motivation (3) Intensive survey. Prereq: Consent of instructor.

515 Colloquium in Experimental Psychology (1) Research and practical issues in experimental psychology. Prereq: Consent of instructor. May be repeated. Maximum 4 hrs. S/N/C only. F,Sp

516 Colloquium in Ethology (1) Current research and theory. May be repeated. Maximum 9 hrs. (Same as Ecology and Evolutionary Biology 516.) S/N/C only. E

521 Analysis of Variance for Social Sciences (3) Analysis of variance and statistical theory: application within social science framework. Contrasts among means, trend analysis, analysis of covariance, analysis of factorial designs, and multivariate approaches to analysis of within subjects data.

522 Multiple Regression for Social Sciences (3) Complexities of regression analyses and theory: application within social science framework. Bivariate correlation and regression, multiple regression, analysis of variable sets, interactions among continuous predictors, reducing co-linearity between main effects and application of multiple regression to testing procedures of mediation and moderation.

526 General Vertebrate Neuroanatomy (3) Lecture and laboratory. Structure and functioning of central and peripheral nervous system. Prereq: 461 or equivalent and consent of instructor.

527 Behavioral Neurology (3) Disorders of nervous system, organic brain dysfunctions. Diagnosis and treatment. Prereq: Consent of instructor.

528 College Teaching in Psychology (3) Concepts, techniques, and materials for teaching psychology at college and/or university level. Supervised practice. Prereq: Consent of instructor. S/N/C only.

543 Cognitive Science (3) Theories and research. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

545 Advanced Animal Behavior (3) (Same as Ecology and Evolutionary Biology 545.)

546 Ethological Psychology (3) Basic ethology and comparative psychology. Implications for human behavior. Prereq: Consent of instructor. (Same as Ecology and Evolutionary Biology 546.)

547 Conceptual Foundations of Evolution and Behavior (3) Critical evaluation of seminal writings on theory and methods in comparative analysis of behavior. (Same as Ecology and Evolutionary Biology 547.)

550 Social Psychology (3) Survey of theory and research concerning interpersonal interaction and individual behavior in social context. Prereq: Consent of instructor. F

554 Laboratory in Psychometrics (3) Further learning about psychometrics theories: item response theory (modern mental test theory), factor analysis, and applications of those methods using computer programs to simulated or empirical data. Prereq: 555. May be repeated. Maximum 6 hrs.

555 Psychometrics (3) Basic concepts: factor analysis, scaling, test theories, probability models and their applications, computerized adaptive testing and other topics. Prereq: Statistics 537-538 or equivalent. May be repeated. Maximum 6 hrs.

557 Applied Psychological Measurement (3) Issues and techniques in applying psychological measurement in organizational, clinical, and community research. Prereq: Statistics 537-538 or equivalent or consent of instructor. May be repeated. Maximum 6 hrs.

558 Interviewing and Observation (3) Sensitizing students to own feelings and beliefs and to feelings of interviewee, and analysis of language content, style, and body language. Exploration of various important aspects of interviewee's life. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 559.

559 Laboratory in Interviewing and Observation (1) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 558.

560 Psychology of Learning (3) Review of current evidence from research involving human and/or non-human animals. Prereq: 400 and consent of instructor. May be repeated. Maximum 6 hrs.

565 History and Systems of Psychology (3) History of philosophy concerning psychology. Major systems of psychology which emerged during 20th century. Prereq: Graduate standing. Sp

570 Personality: Theory and Research I (3) Advanced survey of psychodynamic and neo-Freudian approaches to personality; related research. Prereq: Admission to clinical program or consent of instructor. F

571 Personality: Theory and Research II (3) Advanced survey of behavioral and humanistic approaches to personality; related research. Prereq: Admission to clinical program or consent of instructor. Sp

573 Descriptive and Theoretical Psychopathology (3) Current psychiatric taxonomic system. Theories of etiology for various diagnostic categories. Examples from written case vignettes and recorded interviews. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. F

575 Psychopharmacology (3) Connections between pharmacology and psychology. Prereq: Consent of instructor.

576 Object Relations (3) European and American conceptions of normal and psychopathological development of object relations. Significance for psychotherapy, psychoanalysis, and psychoanalytic theory. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

580 Research Questions and Designs (3) Question-asking process in research and strategies or designs through which answers might be derived. Prereq: Admission to doctoral program in clinical psychology or consent of instructor.

593 Independent, Off-campus, or Foreign Study (1-15) Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

594 Psychological Assessment I (3) Basic concepts and techniques of adult assessment: intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Sp

595 Psychological Assessment II (3) Basic concepts and techniques of adult assessment, intelligence tests and personality tests. Prereq: Admission to doctoral program in clinical psychology and 594 or consent of instructor. F

596 Laboratory in Psychological Assessment (1) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 594 or 595. May be repeated. Maximum 4 hrs. S/NC only. Sp

600 Doctoral Research and Dissertation (3-15) P/ NP only. E

601 Seminar in Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

607 Seminar in Applied Psychometrics (3) May be repeated. Maximum 9 hrs. Prereq: 555, 557, and consent of instructor.

610 Seminar in Applied Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

613 Seminar in Existential-Phenomenological Psychology (3) Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

617 Seminar in Cognitive Science (3) Prereq: 543 and consent of instructor. May be repeated. Maximum 12 hrs.

623 Seminar in Methods of Naturalistic Research (3) Prereq: 546 or consent of instructor. May be repeated. Maximum 12 hrs.

635 Ethical, Legal, and Professional Issues in Psychology (3) Research, human services, teaching and public policy. Prereq: Admission to doctoral program in psychology or consent of instructor. (Same as Counselor Education and Counseling Psychology 635 and Psychoeducational Studies 635.) S/NC only.

670 Psychotherapy I (3) Theories and principles. Prereq: Admission to doctoral program in clinical psychology or consent of instructor. F

671 Psychotherapy II (3) Theories and principles. Prereq: Admission to doctoral program in clinical psychology and 670 or consent of instructor. Sp

673 Laboratory in Psychotherapy (2) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. Coreq: 670 or 671. May be repeated. Maximum 6 hrs. S/NC only.

683 Seminar in Behavioral Medicine (3) Current research and theory concerning relationships between behavior and health. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

695 Field Placement in Clinical Psychology (3) Prereq: Admission to doctoral program in clinical psychology and consent of instructor. May be repeated. Maximum 24 hrs. S/NC only. E

696 Advanced Psychology Clinic Placement (1-3) Prereq: Admission to doctoral program in clinical psychology or consent of instructor. May be repeated. Maximum 24 hrs. S/NC only. E

697 Supervised Field Work in Applied Psychology (1-6) Guided practice in applying psychological principles and techniques in industrial, organizational, and community settings. Prereq: 505, 507, 555, 557, and consent of instructor. May be repeated. Maximum 12 hrs. S/NC only.

Religious Studies

(College of Arts and Sciences)

James L. Fitzgerald, *Interim Head*

Professors:

Dungan, David L., Th.D. Harvard
 Fitzgerald, James L., Ph.D. Chicago
 Hackett, Rosalind I. J., Ph.D. Aberdeen
 Humphreys, W. Lee (Emeritus), Ph.D. ... Union
 Linge, David E. (Emeritus), Ph.D. ... Vanderbilt
 Lusby, F. Stanley (Emeritus),
 M.Div. Colgate Rochester
 Levering, Miriam L., Ph.D. Harvard
 Norman, Ralph V., Jr., Ph.D. Yale
 Reynolds, Charles H., Ph.D. Harvard
 Schmidt, Gilya G., Ph.D. Pittsburgh

Associate Professors:

Gwynne, Rosalind W., Ph.D. Washington
 Hodges, John O., Ph.D. Chicago
 Hulsether, Mark, Ph.D. Minnesota

A master's degree in Philosophy with a concentration in religious studies is available. Contact the department for details of this program. Graduate courses in religious studies provide opportunity for students in a variety of disciplines to pursue work in religious studies as a graduate concentration.

GRADUATE COURSES

405 Modern Jewish Thought (3) History, culture, and geography of the now Israeli portion of Levant from 1850 to present. Founding of modern state of Israel in 1948 and political complexities of Middle East. Israeli culture and literature. Writing emphasis course. (Same as Judaic Studies 405.)

411 Modern Religious Philosophies (3) Religious implications of major Western thinkers and movements from Nicolas de Cusa to nineteenth-century German Idealists. (Same as Philosophy 411.)

412 Classical Indian Systems of Philosophy: The Moksha Tradition (3) Investigation of selected writings and philosophic problems of traditions of Samkhya, Yoga, Vedanta, Buddhism, or Jainism. Prereq: 374 or 376 or consent of instructor.

425 Seminar in Western Religions (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

430 Seminar in American Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

440 Seminar in Comparative Religion (3) Selected figures, themes, movements, and problems. Content varies. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

490 Readings and Research in Religious Studies (3) Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

499 Proseminar in Religious Studies (3) For advanced students in religious studies; required for majors. Selected specific topics: nature and function of myth in religion, problem of evil, transcendence, theories of religion, hermeneutics, integrating various disciplines involved in study of religion. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

503-04 Theory and Method in the Study of Religion (3,3) Classical, modern, and post-modern approaches. Required for students in M.A. concentration in Religious Studies. Consent of instructor. F, Sp

505 Religious Texts and Contexts (3) Critical study of texts and their interpretations: sacred texts, canons, commentaries, religious autobiographies, and religious themes in literature. May be repeated. Maximum 6 hrs.

506 Historical and Comparative Studies of Religions (3) Description and analysis of religious traditions, phenomena, and themes. May be repeated. Maximum 6 hrs.

507 Religion, Power and Society (3) Studies of religions in relation to social structure and political institutions: issues of gender, race, class, ethnicity, caste, slavery, religion and the state, globalization and human rights. May be repeated. Maximum 6 hrs.

513 Religion, the Arts, and the Media (3) Material and expressive culture, religion and journalism, mass communication technologies, popular culture, issues of representation, cultural studies methodologies. May be repeated. Maximum 6 hrs.

514 Religion and Healing (3) Ecology of religion, nature, shamanism, healing of body and mind, spirituality, religious dimensions of medical ethics. May be repeated. Maximum 6 hrs.

515 Critical Reflection on Religion (3) Analytical and constructive thought by scholars of religion and religious thinkers: philosophy of religion, modern and post-modern religious thought, Advaita, Vedanta, neo-Confucianism, and scholastic theology. May be repeated. Maximum 6 hrs.

520 Readings in the Study of Religion (1-6) May be repeated. Maximum 12 hrs.

532 Topics in the History of Religions (3) Prereq: Consent of instructor.

533 Topics in Religious Thought (3) Prereq: Consent of instructor.

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

Russian

See *Modern Foreign Languages and Literatures*

Small Animal Clinical Sciences

See *College of Veterinary Medicine and Comparative and Experimental Medicine*

Social Work

(College of Social Work)

MAJOR **DEGREES**
 Social Work M.S.S.W., Ph.D.

Karen Sowers, *Dean*

Professors:

Bloch, Mary H. (Emeritus), M.S. Ohio State
Cetingok, Muammer,
Ph.D. Washington (St. Louis)
Faver, Catherine, Ph.D. Michigan
Fryer, Gideon W. (Emeritus), Ed.D. . Columbia
Glisson, Charles A.,
Ph.D. Washington (St. Louis)
Granger, Ben P. (Emeritus), Ph.D. ... Brandeis
Hirayama, Hisashi (Emeritus),
D.S.W. Pennsylvania
McLarnan, Georgiana (Emeritus),
M.S.S.W. Tennessee
Mullins, M. Kate (Emeritus), Ph.D. Chicago
Noe, Roger M., D.S.W. Tulane
Nugent, William, Ph.D. Florida State
Orme, John, Ph.D. Washington (St. Louis)
Orten, James D. (Emeritus), D.S.W. . Alabama
Rubenstein, Hia (Emeritus), Ph.D. Chicago
Shatz, Eunice (Emeritus), Ph.D. Brandeis
Sowers, Karen, Ph.D. Florida State
Wodarski, John, Ph.D. Washington (St. Louis)

Associate Professors:

Campbell, Paul M., D.S.W. Alabama
Combs-Orme, Terri,
Ph.D. Washington (St. Louis)
Dupper, David R., Ph.D. Florida State
Egan, Marcia, Ph.D. Maryland
Galambos, Coleen M.,
D.S.W. Catholic University of America
Patterson, David, Ph.D. Utah
Rocha, Cynthia, Ph.D. Washington (St. Louis)
Rogge, Mary, Ph.D. Washington (St. Louis)
Spicuzza, Frank, M.S.S.W. Tennessee
Vaughn, Hugh H., Ed.D. Memphis State

Assistant Professors:

Bowie, Stan L., Ph.D. Barry
Bride, Brian, Ph.D. Georgia
Cummings, Sherry, Ph.D. Georgia
Davis, Cindy, Ph.D. UCLA
DeCoster, Vaughn, Ph.D. LSU
Dulmus, Catherine, Ph.D. SUNY (Buffalo)
Ellis, Rodney, Ph.D. Florida International
Evans, Theora A., Ph.D. Minnesota
MacMaster, Samuel A.,
Ph.D. Case Western Reserve
Staudt, Marlys, Ph.D. . Washington (St. Louis)
Sullivan, Michael, Ph.D. Georgia

Clinical Associates/Field Practice Coordinators:

Allen, Sandra (Memphis),
M.S.S.W. Tennessee
Betz, Phyllis (Knoxville), M.S.S.W. Tennessee
Bowers-Mitchell, Drema (Nashville),
M.S.S.W. Tennessee
Enochs, Peggy (Nashville),
Ed.D. Tennessee State

THE MASTER'S PROGRAM

The Master of Science in Social Work program prepares social workers to provide professional leadership in 1) clinical social work practice and 2) social work management and community practice. These objectives are met through a curriculum requiring of all students a professional foundation and a concentration in either clinical social work practice or social welfare management and community practice. The

M.S.S.W. program is accredited by the Council on Social Work Education.

Admission Requirements

Admission to the master's program is based on the following requirements:

1. A Bachelor's degree from an accredited college or university with appropriate preparation in the social sciences. At least three-fourths of the applicant's undergraduate work should be in the social sciences, humanities, physical sciences, and other Arts and Sciences subjects. Applicants must have a course in human biology and demonstrate a liberal arts perspective through coursework in at least four of the following five areas: economics or mathematics; government, political science or history; sociology or anthropology; psychology; philosophy, literature, or the arts. Applicants with other academic backgrounds may request consultation to discuss ways that they can meet the requirements.

2. A grade point of 2.7 or higher on a 4.0 scale. Applicants falling below this average may be considered for probationary admission on the basis of supplemental evidence of the ability to perform at a satisfactory level. The University requires a minimum GPA of 2.7 for admission to graduate study.

3. Personal qualifications acceptable for entrance into the professional practice of social work.

4. All applicants must submit up-to-date scores from the Graduate Record Examination (general).

Preference is given to applicants with a GPA of 3.0 or above in their undergraduate work with substantial preparation in the social sciences.

Advanced Standing

The University of Tennessee College of Social Work has an advanced standing program. Admission to advanced standing requires: (1) a B.S.W. from an accredited program, (2) an overall undergraduate GPA of 3.0 or higher, and (3) personal qualifications acceptable for entrance into the professional practice of social work. Students admitted into advanced standing are required to complete a minimum of 36 hours of study in either of the college's concentrations - clinical social work practice or social work management and community practice. These students will follow the curriculum plan and meet all requirements of the concentration during three semesters of study in the program.

Application for admission to the advanced standing program is through the regular admission process.

Extended Study

Planned part-time programs are available in all three locations of the college. Admission requirements are the same as for full-time study. Coursework can be completed over a three-year period.

Financial Aid

Students may apply directly to the University's Financial Aid Office for assistance such as the National Direct Student Loan or the Work-Study Program. Information regarding scholarships administered by the College is made available after admission.

General Requirements

1. The program requires successful completion of a minimum total of 60 semester hours including completion of the foundation curriculum (30 hours) and 30 hours in one of the two concentrations (clinical social work practice or social welfare management and community practice).

2. Students may select a thesis or non-thesis option. Students pursuing the thesis option receive six credit hours for successful completion.

3. Students must successfully complete a comprehensive exam or thesis defense.

4. Students must have an overall GPA of 3.0 or better on all graded courses and satisfactory performance in field.

The Professional Foundation Curriculum

All students must complete 30 semester hours in the foundation curriculum consisting of 24 hours in foundation classroom courses and 6 hours in field practice. The foundation is the initial phase of the master's program. It contributes to the process of professional identification and presents a comprehensive, broad base of theory, knowledge and skills from which to practice. The foundation classroom courses include Foundations of Social Work Practice I, II and III; Human Behavior in the Social Environment I and II; Social Welfare Policy and Services; Social Work Research; and Social Work and Oppression. Students also complete a two-semester field placement, Field Practice (6 hours). Upon successful completion of the foundation curriculum, all students must complete a minimum of 30 hours in the concentration curriculum including field practice (12 hours). Students select a concentration in clinical social work practice or social welfare management and community practice.

Clinical Social Work Practice: The clinical social work practice concentration focuses on students developing expertise in clinical social work practice with client systems including individuals and small groups, particularly with clients from high-risk and vulnerable groups. The concentration emphasizes theoretical and empirical knowledge and practice skills in differential assessment, clinical interventions and practice evaluation. The concentration also emphasizes knowledge and skills directed toward (1) amelioration of complex psychosocial, interpersonal problems; (2) ethically sound and culturally sensitive practice; and (3) influencing the development of services and programs that are responsive to the needs of vulnerable, high-risk clients and groups.

Required courses:

521 Clinical Social Work Practice with Individuals (3 hours)
525 Clinical Social Work Practice with Groups (3 hours)
526 Evaluating Clinical Practice (3 hours)
582-83 Field Practice (12 hours)

Minimum of three (total of 9 hours)

advanced course electives as follows:
One or more from a pool of advanced clinical practice courses.

One or more from a pool of advanced general courses.

Social Welfare Management and Community Practice: The social welfare

management and community practice concentration focuses on students' developing skills directed toward the management and analysis of complex service delivery needs within organizations and communities, knowledge and skills in the development of service intervention strategies to address such and related needs, and the organizational and management skills that enable practitioners to work in a variety of challenging and turbulent environments. The concentration emphasizes theory and skills related to leadership and administration and permits flexibility in tailoring a program to fit the student's individual interests, capabilities, and career goals.

Required courses:

541 Leadership and Management in

Human Services (3 hours)

543 Financial Management and Resource Development (3 hours)

547 Evaluation Research (3 hours)

582-83 Field Practice (12 hours)

Minimum of three (total of 9 hours)

advanced course electives as follows:

One course in advanced policy (3 hours).

Two courses from a pool of advanced general courses (6 hours).

Field Practice

Field instruction is a critical component of the student's first- and second-year programs. Through cooperation with a wide range of social agencies and human service programs throughout Tennessee, the college is able to provide field placements in a variety of social work practice areas. The faculty works closely with the placement agencies and the field instructors to insure that students have quality field practice experiences that meet the objectives of the core curriculum and the concentration.

The college uses a concurrent class and field plan. Students are in field two days per week during the first year and three days per week during the second year.

First-year agency placements are selected to provide practice experiences related to the foundation curriculum content. Within the placement, each student's experiences are planned and designed according to educational objectives.

Second-year placements are selected according to the student's area of concentration, individual career interests, and educational needs. The student actively participates with the field practice coordinator and the educational committee in selection of the second-year placement. The second-year field placement experience focuses on the integration of social work knowledge and values and emphasizes the acquisition and development of practice skills.

Students are responsible for meeting the requirements of their placement agencies in terms of office hours and workload coverage. This responsibility takes precedence over scheduled University breaks and may result in variations in holidays and office hours for the student.

Students receiving a grade of NC in field practice may not repeat the field practice.

Transfer Credits

Coursework equivalent to the first year of the master's program, completed in another accredited graduate social work program, is usually accepted toward degree require-

ments. Applicants must meet the admission requirements of the Graduate Council and the College of Social Work. Transfer courses must be approved as equivalent to required and/or elective courses taken for graduate credit and passed with a grade of B or better. An S (earned on an S/NC system) for the field practicum is also accepted. In addition, transfer courses must be part of an otherwise satisfactory graduate program (B average) and be approved by the dean. This coursework must be completed within the six-year period prior to the receipt of the degree.

A maximum of 6 semester credits from work earned in disciplines other than social work may be transferred as elective credits. The student's academic committee must approve the request and the transfer credit must meet Graduate Council requirements.

Proficiency Examination

Students in the master's program may earn a maximum of nine hours by proficiency examination, with the exception of field practice courses. Students interested in proficiency examinations are referred to the Graduate Catalog statement describing the procedure for applying for examination.

THE DOCTORAL PROGRAM

The College of Social Work offers the Doctor of Philosophy with a major in Social Work.

The focus of social work education at the doctoral level is to foster the development of an attitude of scientific inquiry, knowledge of the scientific method, ability to extend the knowledge base of social work practice, and effective participation in leadership roles in social work education, research, and practice.

The emphasis of the doctoral program is upon:

--The analysis of direct intervention and social administration and of the interrelationships among each of them and their social policy, organizational, and community contexts.

--Research-based knowledge to inform and guide social work practice, social policy, and social welfare program development.

The program consists of foundation courses, elective courses, and dissertation research. The courses are available only in Knoxville. Students and their committees can develop a plan for completing their research in Nashville and Memphis based on the availability of dissertation resources.

Students have the opportunity to work in the Children's Mental Health Services Research Center as part of their training. The Center focuses on services to children who have experienced mental health problems associated with abuse, neglect, violence and a variety of psychosocial problems.

Admission Requirements

The Ph.D. program is designed for students who have completed a master's degree in an accredited school of social work and have post-master's social work/social welfare experience. Applicants who do not meet these requirements, but believe they have equivalent credentials should contact the Chair of Ph.D. program for further information regarding admissions criteria.

General Requirements

1. A minimum of 66 hours beyond the master's degree including: a) completion of 27 hours of required coursework, b) completion of 15 credits of advanced electives, at least 12 of which are taken outside the department, and 9 of those 12 related to the dissertation, and c) completion of at least 24 credit hours of dissertation research.

2. Successful completion of qualifying and comprehensive examinations.

3. Completion and defense of the dissertation.

Curriculum

The curriculum of the Ph.D. program consists of foundation coursework, electives, and dissertation research. The foundation curriculum consists of 27 hours of coursework in the history and philosophy of social work, issues in direct service and administration and planning, areas of practice, and research methodology and statistics. Upon this foundation, students and their academic committees develop a plan of study consisting of coursework in Social Work and other departments of the University.

Typically, the 24 hours of foundation curriculum are completed and elective coursework begun during the first year of study, Social Work 670 and the elective requirement are completed and dissertation research begun in the second year of study, and dissertation research is continued in the third year of study. While it is generally expected that the coursework will be completed on a full-time basis, dissertation research can be completed on a planned part-time basis.

Specific courses required are 601, 602, 612, 613, 640, 650, 670, and Statistics 531 and 532 or any two graduate level statistics courses approved by the Doctoral Program Chair.

Examinations

All doctoral students are required to pass a qualifying examination and a comprehensive examination. The qualifying examination covers the foundation curriculum. The comprehensive examination is administered by members of the comprehensive exam committee and is designed for the student to demonstrate comprehensive knowledge of the major and cognate areas and the dissertation topic. In case of failure of either examination, the student may request a retake. The result of the second examination is final.

Financial Aid

Financial aid is available to qualified students in the form of fellowships, scholarships, and teaching and research assistantships. Graduate assistantships and other forms of assistance are awarded on the basis of merit and interest to applicants who are accepted into the Ph.D. program.

MINOR IN GERONTOLOGY

Graduate students in the College of Social Work, at the Knoxville location, may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the

knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

POST-MASTER'S CERTIFICATE IN MANAGEMENT AND COMMUNITY PRACTICE

The College of Social Work offers a 15-credit hour post-master's certificate program designed for social workers desiring supervisory, management, administration and community practice training and education to enhance career advancement or career redirection. A master's degree in social work or a closely related field is required for admission.

Course requirements are 541, 543, 547, and two courses selected from 550, 551, 552, 555.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.S.S.W. and Ph.D. programs in Social Work are available to residents of the state of Arkansas; the Ph.D. to residents of Delaware, Oklahoma or West Virginia. Additional information may be obtained from the Administrative Services Assistant in the Office of Graduate Admissions.

GRADUATE COURSES

NOTE: Graduate students majoring in fields other than social work are admitted to certain social work courses with the approval of the College of Social Work and the student's major professor.

500 Thesis (1-15) P/NP only. E

501 Foundations of Social Work Practice I (3) Survey of history, mission, and identity of profession. Basic theory, professional values and ethics, and methods generic to social work practice at various systems levels. Assessment, planning, communication, intervention, and evaluation skills.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

503 Foundations of Social Work Practice II (3) Generalist practice with family and small group systems. Ecological theory to frame understanding of such systems and their adaptation to environments. Various social work roles and intervention strategies pertaining to client systems.

504 Foundations of Social Work Practice III (3) Basic theory, methods, problems, and strategies in implementing planned change within and among larger social systems: task groups, human service organizations, and community systems. Various practice roles: planner, program developer, supervisor, administrator, advocate and task group leader.

506 Social Work Research (3) Research methodologies with respect to evolution and application to social work theory and practice. History and philosophies of science; problem formulation; research design; ethics; instrument use and construction; data collection; analysis and reporting; and evaluation and utilization of research.

508 Practicum in Social Work Research (3-6) Supervised practice in application of research methods to social work. May be repeated. Maximum 6 hrs. S/NC only.

509 Graduate Seminar in Public Health (1) (Same as Public Health 509, Exercise Science 509, Nutrition 509, and Nursing 509.)

514-15 Human Behavior in the Social Environment I, II (3,3) Major social science theories that inform social work profession's understanding of human behavior and social systems from ecological perspective. Interactions among biological, social, psychological, and cultural systems on development across life cycle. Effects of ethnic, racial, economic, gender, and sexual orientation variables. 514—Life cycle from infancy through adolescence. 515—From young adulthood through senescence.

516 Social Welfare Policy and Services (3) Development of contemporary social policy at local, state, national, and international levels. Contribution of social work professionals to formal policy-making process through which macrosocial change is effected and through which aggregate social welfare services are proposed, authorized, financed, and programmed. Theories of complex organizations applied to social welfare service delivery settings.

518 Social Work and Oppression (3) Sources, dynamics, and impact of oppression in U.S. society as manifested in both social/ecological/economic systems and personal experience. Connections among various forms of oppression: racism, sexism, classism, and heterosexism, and forces that perpetuate such conditions.

521 Clinical Social Work Practice with Individuals (3) Theories, knowledge, and skills for clinical practice with individuals from ecological perspective. Therapeutic process and intervention strategies, incorporating content from psychodynamic and cognitive practice models, and specific client problems.

523 Clinical Social Work Practice with Families (3) Concepts related to understanding and analyzing family dynamics and interactional patterns from perspective of major family therapy models. Techniques of intervention in terms of application to families with varied system and individual problems and to families from varied social and cultural backgrounds.

525 Clinical Social Work Practice with Groups (3) Theoretical and historical approaches to social work with groups and clinical principles supporting specific types of group work used in clinical practice and associated leader interventions.

526 Evaluating Clinical Practice (3) History and philosophies, conceptual approaches, techniques and methods in the practice and use of practice research as applied to implementation and evaluation of direct services to clients.

530 Seminar in Clinical Social Work (2-3) Topics in theory and practice of clinical social work with individuals, couples, families and groups. May be repeated. Maximum 6 hrs.

532 Short-Term Interventions (3) Theory and practice of planned short term, emergency, and crisis interventions.

533 Social Work Interventions with Couples (3) Theories regarding contemporary marital/partnering lifestyles, problem areas in relationships, methods and skills for problem resolution.

534 Social Work Interventions with Children and Adolescents (3) Various practice modalities for assessing and intervening with children and adolescents.

535 School Social Work (3) Place of school as community institution and resource. Methods, processes, and techniques employed in school social work.

540 General Topics in Social Work (3) Current topics in advanced social work. May be repeated. Maximum 6 hrs.

541 Leadership and Management in Human Services (3) Management practices and leadership skills required in development and management of human services delivery systems. Issues regarding human resources management, resource allocation, strategic planning, and organizational dynamics.

543 Financial Management and Resource Development (3) Administrative decision-making related to financial planning and resource allocation in human

service organizations. Knowledge and skills in budgeting, allocating, expenditure control, fundraising, grant writing, marketing, and evaluation.

547 Evaluation Research (3) History and philosophies, conceptual approaches, techniques and methods, and issues in practice and utilization of evaluation research as applied to development and evaluation of social work programs and policies. Issues pertaining to strengths and limitation of various evaluation methods, microcomputer application of data, and measurement of program goals and objectives.

550 Seminar in Management and Community Practice (2-3) Topics in theory and practice of management and community practice. May be repeated. Maximum 6 hrs.

551 Seminar in Social Welfare Policy (3) Advanced social welfare policy seminar in specific fields of practice. May be repeated. Maximum 6 hrs.

552 Community Organization (3) Locality development, social planning and social action as practice models for development of resources to meet human needs.

561 Supervision and Consultation in Social Work (3) Roles, techniques, and practices of social work supervision and consultation.

564 Substance Abuse (3) Survey and analysis of social, cultural, medical and psychological factors underlying alcoholism and drug abuse and addiction; recent research and practice innovations.

566 Social Gerontology (3) Physical, psychological and social aspects of aging, and major social policies and programs.

580 Field Practice (3) Instruction and supervision in social work practice. S/NC only.

581 Field Practice (3) Instruction and supervision in social work practice. S/NC only.

582 Field Practice (6) Instruction and supervision in clinical social work practice or management and community practice. S/NC only.

583 Field Practice (6) Instruction and supervision in clinical social work practice or management and community practice. S/NC only.

584 Field Practice (2-6) Instruction and supervision in social work practice. May be repeated. S/NC only. E

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Counselor Education and Counseling Psychology 585, Exercise Science 585, Nursing 585, Public Health 585, Psychoeducational Studies 585, and Sociology 585.)

593 Independent Study (1-6) Individualized study, student selects, designs, and completes examination of special issue or problem. May be repeated. Maximum 6 hrs.

600 Doctoral Research and Dissertation (3-15) P/NP only. E

601 Research for Social Work Practice I (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice. F

602 Research for Social Work Practice II (3) Epistemological and methodological considerations for both quantitative and qualitative research for social work practice. Sp

604 Research in Social Service Settings (3) Advanced research, under faculty supervision, of practice issues in community agency. Prereq: First year required Ph.D courses or consent of instructor. May be repeated. Maximum 9 hrs. F,Sp

605-06 Analysis of Social Work Data I, II (3,3) Techniques for quantitative analysis of social work data: unique data analysis problems encountered in social work research.

608 Evaluative Research for Social Work Practice, Programs and Policy (3) Techniques and strategies for quantitative and qualitative analysis for social policy's impact on individuals and groups and for evaluating processes and outcomes of social work practice. F

612 Social Work Practice and Its Social Context I (3) Critical analysis of knowledge bases of major practice modalities in direct intervention. F

613 Social Work Practice and Its Social Context II (3) Critical analysis of knowledge bases of major practice in administration and planning. Sp

640 History of American Social Work (3) Social, cultural, economic and political contexts for development of social work profession, development of education for profession, and modern welfare system. F

650 Programs and Legislation for Children and Families (3) Background, purposes, and current issues surrounding major social welfare and health programs serving disadvantaged children and their families: Social Security Act (Title IV, Child Welfare and AFDC; Title V, the Maternal and Child Health Block Grant; Title XIX, Medicaid), Head Start, WIC and other nutrition programs, and Healthy Start. Current issues and controversy; legislative changes.

660 Issues in Social Work Knowledge Building (3) Advanced seminar in theory and model building in direct intervention, administration and planning. Prereq: First year required Ph.D. courses or consent of instructor. May be repeated. Maximum 9 hrs. F,Sp

670 Critical Literature Reviews (3) Techniques and methods for conducting critical reviews of literature: conceptual and methodological critiques of existing research. S/NC only.

693 Directed Study in Social Work Research (3) Advanced individual study, under faculty guidance, of social work practice issues. Prereq: First year required Ph.D. courses or consent of instructor. May be repeated. Maximum 9 hrs. F,Sp

Sociology

(College of Arts and Sciences)

MAJOR DEGREES

Sociology M.A., Ph.D.

Suzanne B. Kurth, *Head*

Professors:

Hastings, Donald W., Ph.D. Massachusetts
Hood, Thomas C., Ph.D. Duke
Perrin, Robert G., Ph.D. British Columbia
Shover, Neal, Ph.D. Illinois
Wallace, Samuel E., Ph.D. Minnesota

Associate Professors:

Cable, Sherry, Ph.D. Penn State
Jalata, Asafa, Ph.D. SUNY (Binghamton)
Jones, Robert E., Ph.D. Washington State
Kurth, Suzanne B., Ph.D. Illinois (Chicago)

Assistant Professors:

Bui, Hoan, Ph.D. Michigan State
Shefner, Jon, Ph.D. California (Davis)

The Sociology Department offers graduate study leading to the Master of Arts and the Doctor of Philosophy. The M.A. program includes a thesis and non-thesis option. The graduate program has concentrations in criminology; energy, environment, and resource policy; and political economy. The criminology concentration includes 505, 551, 653, and 655. The energy, environment and resource policy concentration includes 560, 563, 661, and 665. The political economy concentration includes 504, 540, 541, 543, 644, and 645. Both the master's and the doctoral program allow for the

construction of individualized programs of study. Detailed information may be obtained from the Programs and Curriculum Committee in Sociology. New students are admitted in fall semester only and applications must be received by the Graduate Student Services Office by February 1.

ADMISSION REQUIREMENTS

1. Acceptable scores on the general Graduate Record Examination (verbal, quantitative, and analytical) are required.
2. Three letters of recommendation (forms may be obtained from the department).
3. Completion of the appropriate previous degree (baccalaureate, preferably with a major in one of the social sciences, for the M.A. program; master's degree in one of the social sciences for the doctoral program).

THE MASTER'S PROGRAM

Thesis Option

A minimum of 30 hours beyond the baccalaureate degree, including 24 hours of coursework and 6 hours of Thesis 500, is required. Students must complete Sociology 521, 531, Statistics 531, and one foundation course (504, 505, or 560). At or near the end of all coursework, the student must take an oral examination on course material and thesis. The examination will be administered by the student's committee.

Non-Thesis Option

A minimum of 30 hours of coursework is required, including Sociology 521, 531, Statistics 531, and one of the following: 504, 505, or 560. Sociology 534, 622, and Statistics 532 are recommended. A student's plan of study should follow **one** of the following approaches: Plan 1, 6 hours in one of the department's concentrations and 6 hours in a second area, including areas outside the department, subject to the approval of the student's committee; Plan 2, 12 hours in a special area of study approved by the student's committee and the department's Programs and Curriculum Committee. Students are encouraged to prepare a paper synthesizing their knowledge of the concentration(s). Students who incorporate supervised field experience in their programs are encouraged to prepare a report based on those experiences that demonstrates their understanding of research, theory, and report writing. All students must take final written and oral examinations that include questions on their general coursework in theory and methods and on their special areas of study.

Subject to approval by the student's committee, up to 12 hours may be taken in courses outside the department for either program. Sociology courses at the 400 level may also be taken with the approval of the student's committee.

THE DOCTORAL PROGRAM

Coursework

Twenty-four hours of coursework beyond the master's degree are required (exclusive of S/NC credits). Twelve hours of course credit in Sociology at the 600 level are required. Students who enter the program without the courses required for the

M.A. degree (521, 531, Statistics 531) or their equivalents must take them as remedial work which does not apply to their residence. Students must complete Sociology 622; 534, 563, 633, or 636; and Statistics 532 or another advanced course in statistics. Completion of 9 hours in each of two concentrations is encouraged. A student who cannot achieve his/her educational goals within the department's concentrations may construct an individualized course of study subject to the approval of the student's doctoral committee and the Programs and Curriculum Committee. Sociology courses at the 400 level may not be taken without the consent of the student's advisor and the Programs and Curriculum Committee. Six hours may be taken in related fields without petitioning the Programs and Curriculum Committee for approval. The student's program may include a minor or cognate field.

Comprehensive Examinations

Written examinations in four areas are required (sociological theory, research methodology, and two substantive areas). Doctoral students are eligible to take the theory and methodology examinations whenever offered. Substantive examinations may be taken upon completion of theory and methodology examinations. Detailed information on examinations and examination options (generalist, specialist, and colateralist) may be obtained from the department.

Dissertation and Final Examination

A dissertation based on original research must be completed (24 hours). The candidate must pass an oral defense of the dissertation, including the theory and methodology related to the research, in accordance with the deadlines specified by Graduate Student Services.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

MINOR IN GERONTOLOGY

Graduate students in the Department of Sociology may pursue a specialized minor in gerontology. This interdepartmental/interdisciplinary minor gives the student an opportunity for combining the knowledge about aging in American society with his/her major concentration. Please refer to Human Ecology for specific requirements.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.A. program in Sociology is available to residents of the state of Virginia (concentration in criminology only); the Ph.D. to residents of Florida (concentration in criminology only), or West Virginia. Additional information may be obtained from the Administrative Services Assistant in the Office of Graduate Admissions.

GRADUATE COURSES

405 Sociology of Sport (3) Social meaning, organization, and process of sport. Prereq: 291 or consent of instructor.

414 Sociology of Health Care (3) Organization of health care facilities, staff-patient relationships, demographic characteristics, and prevalence of disease.

415 Sociology of Aging (3) How roles and statuses change with age in relation to major social institutions; impact that rapidly increasing number of older people has on society, effect of society on older people.

446 The Modern World System (3) Critical examination of capitalist world-system as social system, its coherence, boundaries, regions, member groups, cleavages, and patterns of conflict. Analysis of who gets what, why, and how in global political economy.

451 Criminal Justice (3) Critical assessment of criminal justice apparatus and its components. Brief examination of police; criminal courts and institutions, and programs: prison probation, and parole. Analysis of their operation and impacts. Recommended prereq: 350. (Same as Legal Studies 451.)

455 Society and Law (3) How laws and legal processes are affected by social change, social impact of legal sanctions, relations between law and social justice. (Same as Legal Studies 455.)

459 White-Collar Crime (3) Distinctive nature and dynamics of white-collar crime, victims and costs of white-collar crime, organizations as white-collar offenders, causal theories, and dynamics of responses to white-collar crime by private and public parties.

462 Population (3) Demographic factors and social structure; trends in fertility, mortality, population growth, migration, distribution, and composition; population policy.

464 Urban Ecology (3) Relation of humans to their urban environment: conservation and use of appropriate technology. (Same as Urban Studies 464.)

465 Social Values and the Environment (3) Human dimensions of ecosystem management and public policy. Applied focus on social values activated within specific biophysical and social settings. Prereq: 110 Social Problems and Social Change or 120 General Sociology or consent of instructor.

471 Sociolinguistics (3) (Same as English 471 and Linguistics 471.)

500 Thesis (1-15) P/NP only. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

504 Sociological Foundations of Political Economy (3) Survey of contemporary sociological theories of political economy, sources of political and economic power and conflict.

505 Foundations of Criminology (3) Critical overview of contemporary developments in criminology, theories of crime causation and theories of responses to crime. Prereq: 350 or equivalent.

507 Foundations of Social Psychology (3) Current and classical theoretical perspectives in social psychology.

510 Teaching Sociology (3) Art and craft of teaching sociology from curricular considerations through teaching techniques. May be repeated. Maximum 6 hrs

521 Sociological Theory I (3) Assessment of what sociological theory is; its major figures and their approaches to understanding society.

531 Research Methods in Sociology (3) Research design, measurement, sampling, quantitative and qualitative data collection techniques, data, reduction, and analysis.

534 Advanced Sociological Analysis (3) Underlying assumptions and logical procedures used by sociologists in formulating explanations; foundations of sociological research strategies and techniques.

540 Occupations (3) Occupations in relation to individuals and society, technology, economic stratification, and social organizations.

541 Collective Behavior, Social Movements, Social Change (3) Basic theory and research on conditions of social unrest in human collectivities and efforts of collectives to change existing society.

543 Sociology of Development (3) Sociological theories and studies of development: modernization, colonialism, dependency; comparative impact of various development paths upon selected aspects of social structure and change.

551 Delinquency and the Social Structure (3) How study of delinquency and juvenile justice is affected by changing structures of childhood and adolescence, changing demographic and institutional influences, and changing views about responsibility and punishment.

560 Environmental Sociology (3) Systematic treatment of current research in environmental sociology. Social impact analysis and conflicts over environmental issues.

563 Demographic Techniques (3) Standard rates and measures of demographic variables, life table analysis, increment-decrement models, and survey techniques of population analysis.

580 Advanced Rural Sociology (3) (Same as Rural Sociology 580.)

585 Seminar in Gerontology (1) (Same as Human Ecology 585, Counselor Education and Counseling Psychology 585, Exercise Science 585, Nursing 585, Public Health 585, Psychoeducational Studies 585, and Social Work 585.)

591 Foreign Study (1-15) See College of Arts and Sciences.

592 Off-Campus Study (1-15) See College of Arts and Sciences.

593 Independent Study (1-15) See College of Arts and Sciences.

599 Readings (3) Selected topics. May be repeated. Maximum 6 hrs.

600 Doctoral Research and Dissertation (3-15) P/ NP only. E

622 Sociological Theory II (3) Distinct schools of sociological theory and contributions of their principal exponents. Prereq: 521 or consent of instructor.

629 Supplementary Readings in Sociological Theory (3) Individual guidance. Preparation for comprehensive examination. Prereq: Consent of instructor. S/ NC only.

633 Survey Design and Analysis (3) Systematic exploration of survey problems through student participation in design and analysis of survey. Prereq: 531 or consent of instructor. (Same as Child and Family Studies 633.)

636 Field Research (3) Research experience in selected field sites using techniques of interviewing, participant observation, and other methods of field research. Prereq: 531 or consent of instructor.

639 Supplementary Readings in Methodology (3) Individual guidance. Preparation for comprehensive examination. Prereq: Consent of department. S/NC only.

644 Political Sociology (3) Critical examination of theories of state and political processes.

645 Advanced Studies in Political Economy (3) Topical seminar. Prereq: 504 or consent of instructor. May be repeated. Maximum 6 hrs.

649 Supplementary Readings (3) Prereq: Consent of department. May be repeated. Maximum 6 hrs. S/NC only.

653 Sociology of Law (3) Intensive examination of selected topics in sociology of law. Prereq: 505 or consent of instructor.

655 Advanced Studies in Criminology (3) Intensive examination of selected topics in criminology. Recommended prereq: 505. May be repeated. Maximum 6 hrs.

661 Theory and Methods of Human Ecology (3) Historical and contemporary studies of interaction

between humans and their environment. Prereq: Consent of instructor.

665 Advanced Studies in Energy, Environment and Natural Resources Policy (3) Topical seminar covering particular lines of research and theory within area. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

675 Advanced Studies in Social Psychology (3) Selected contemporary research issues related to social psychological theories. Prereq: 541 or consent of instructor. May be repeated. Maximum 6 hrs.

695 Advanced Special Topics (3) Topic of special interest or student-initiated courses that will not be regularly offered. Prereq: Consent of department. May be repeated. Maximum 6 hrs.

699 Tutorials in Advanced Topics (3) Individual instruction. Prereq: Consent of department. May be repeated. Maximum 6 hrs.

Spanish

See Modern Foreign Languages and Literatures

Speech Communication

(College of Communications)

MAJORS**DEGREES**

Communications M.S., Ph.D.

John W. Haas, *Head*

Professors:

Julian, Faye D. (Liaison), Ph.D. Tennessee
Lester, Lorayne W., Ed.D. Tennessee
Yeomans, G. Allan (Emeritus),
Ph.D. Louisiana State

Associate Professors:

Ambrester, M. L., Ph.D. Ohio
Cook, N. C., M.A. Alabama
Glenn, Robert W., Ph.D. Northwestern
Haas, John W., Ph.D. Kentucky

Assistant Professors:

Ambler, R. S., Ph.D. Ohio State
Halone, Kelby K., Ph.D. Oklahoma
Violanti, Michelle T., Ph.D. Kansas

The Department of Speech Communication offers a concentration area for the master's degree with a major in Communications and participates in the interdisciplinary doctoral program. See Communications for additional information.

Graduate courses in Speech Communication also provide opportunities for students in a variety of disciplines to investigate how oral language can effect changes in the knowledge, the understanding, the ideas, the attitudes, or the behavior of other human beings.

GRADUATE COURSES

466 Rhetoric of the Woman's Rights Movement to 1930 (3) Historical and critical study of public address in campaign for women's rights in United States from 1830's through 1920's. (Same as Women's Studies 466.)

476 Rhetoric of the Contemporary Feminist Movement (3) Historical and critical study of rhetoric in campaign for women's rights in United States from 1940's to present. (Same as Women's Studies 476.)

505 Research Methods (3) Understanding of wide array of data collection and analysis procedures used in speech communication research. Development of project/thesis proposal.

510 Orientation to Teaching Assistantship (1) Curriculum, classroom management, and other issues associated with teaching at college level. For departmental GTAs.

525 Seminar in Interpersonal Health Communication (3) Current research in health communication: support groups, medical ethics, medical narratives, doctor-patient communication, or interpersonal communication theoretical perspectives in medicine.

550 Organizational Culture (3) Clarification of complex nature of organizational culture to communicate meaning and its usefulness to organizational effectiveness: challenges created by today's changing organizations and workforces.

560 Special Topics in Speech Communication (3) Contemporary topics. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

580 Contemporary Rhetorical Theory (3) Current theoretical contributions to rhetoric: Burke, Perelman, Weaver, feminist and critical scholars.

590 Directed Reading and Research (3) May be repeated. Maximum 6 hrs.

591 Foreign Study (1-15) Independent study outside U.S. Prior to departure student must have plan of study approved by department head and supervising faculty member. Credit given only upon fulfilling all requirements set by department. May be repeated. Maximum 15 hrs.

592 Off-Campus Study/Internship (1-6) Independent study outside traditional classroom setting: community involvement and/or work experiences. Credit given only upon fulfilling all requirements set by department. May be repeated. Maximum 6 hrs.

593 Independent Study (1-6) Independent study by individual under direction of faculty member. Must obtain approval of faculty member and department prior to study.

Statistics

(College of Business Administration and Intercollegiate Program)

MAJORS DEGREES

Statistics M.S.
Business Administration Ph.D.

Robert W. Mee, *Head*

Professors:

Bozdogan, Hamparsum, Ph.D. Illinois
Guess, Frank M., Ph.D. Florida State
McLean, Robert A. (Emeritus), Ph.D. . . Purdue
Mee, Robert W., Ph.D. Iowa State
Parr, William C., Ph.D. Southern Methodist
Philpot, John W. (Emeritus), Ph.D. VPI
Sanders, Richard D. (Emeritus), Ph.D. . Texas
Sylwester, David L. (Emeritus),
Ph.D. Stanford
Thigpen, Charles C. (Emeritus), Ph.D. VPI

Associate Professors:

Leitnaker, Mary G., Ph.D. Kentucky
León, Ramón V., Ph.D. Florida State
Seaver, William L., Ph.D. Texas A&M
Walker, Esteban, Ph.D. VPI
Younger, M. S. (Liaison), Ph.D. VPI

Assistant Professors:

Bensmail, Halima, Ph.D. Paris
Kim, Hyunjoong, Ph.D. Wisconsin

Additional Intercollegiate Program Faculty:

Aikens, Charles, Engineering; Bates, Ben, Communications; Bunting, Dewey, Arts and Sciences; Carney, Paula, Human Ecology; Chang, Hui, Business Administration; Chatterjee, Arun, Engineering; Eastwood, David, Agricultural Sciences and Natural Resources; Gant, Michael, Arts and Sciences; Glisson, Charles, Social Work; Gross, Louis, Arts and Sciences; Huck, Schuyler, Education; James, Lawrence, Business Administration; Ladd, R. T., Business Administration; Lounsbury, John, Arts and Sciences; Lyons, William, Arts and Sciences; McLemore, Dan, Agricultural Sciences and Natural Resources; Mefford, Linda, Nursing; Miller, Mark, Communications; Orme, John, Social Work; Rajput, Balram, Arts and Sciences; Rosinski, Jan, Arts and Sciences; Samejima, Fumiko, Arts and Sciences; Saxton, Arnold, Agricultural Sciences and Natural Resources; Schmidhammer, James, Business Administration; Singletary, Michael, Communications; Smith, Julius, Arts and Sciences; Wagner, Carl, Arts and Sciences; Xiong, Jie, Arts and Sciences.

THE MASTER'S PROGRAM

The M.S. program in Statistics provides students with the foundations in theory and practice required for careers in applied statistics. In addition to the education traditionally offered in such a program, the department offers a concentration in industrial statistics, which provides unique opportunities for experiences in practical applications of statistics. Through involvement in The University of Tennessee Practical Strategies for Process Improvement Institute and related programs, department faculty participate in a variety of consulting and research projects in industry. Students may supplement their classroom study with an industrial internship and participation in research projects dealing with industrial problems. Department faculty also collaborate with researchers from many academic disciplines. Statistics graduate students may gain consulting experience by working with faculty involved in these consulting activities. All students are encouraged to participate in supervised internship or consulting activities as part of their graduate program.

Individuals with undergraduate or graduate degrees in other disciplines are encouraged to enter the program. The candidate's mathematics background should include differential and integral calculus of several variables. Individuals with limited mathematics background should seek departmental guidance regarding specific ways in which they may prepare themselves for the program by taking coursework as non-degree students. Requests for application forms and further information may be sent to the Director of Graduate Studies, Department of Statistics, Stokely Management Center, University of Tennessee, Knoxville, TN 37996-0532 or mleitnaker@utk.edu or <http://www.bus.utk.edu/stat>.

Admission Requirements

General admission requirements for graduate study are stated beginning on page 12. Applicants for Statistics must submit results of the Graduate Record Examination (GRE) general portion, although GMAT exam scores may be substituted. Applicants for the statistics program must have completed at least two years of college-level mathematics, including the calculus of several variables and matrix algebra, and be proficient in a computer language. Applicants whose native language is other than English must submit results of the Test of English as a Foreign Language (TOEFL).

Curriculum

A minimum of 33 credit hours must be completed for the master's degree. Required of all students are 6 hours in statistical methods, 6 hours in statistical theory and 1 hour in statistical computing. Students must complete a minimum of 21 hours in approved statistics courses, exclusive of consulting, internship, independent study, or thesis.

Thesis or Independent Study

The thesis option for the master's degree requires the student to complete 6 hours for the thesis. Alternatively, the non-thesis option requires a minimum of 3 hours for an independent study project.

Comprehensive Examination

Students must pass a two-part written comprehensive examination covering 1) theory and 2) methods. Upon failing either part of the examination, the student may retake it. The result of the second examination is final. For students writing a thesis, this examination must be passed before the thesis is defended.

INTERCOLLEGIATE GRADUATE STATISTICS PROGRAM

The Intercollegiate Graduate Statistics Program (IGSP) is a formal University of Tennessee academic program established to enable students to earn either a minor or an M.S. in Statistics simultaneously with a master's or doctoral degree in another department. Approved coursework taken to meet doctoral requirements in the student's home department may also be credited toward the M.S. in Statistics. Similarly, approved coursework in statistics taken to meet the requirements for a master's or doctoral degree in another department may also count toward the minor in Statistics. The program is open to graduate students in all departments which have an approved minor and/or M.S. joint major curriculum offered through the program. The program is administered by an Executive Committee, consisting of college representatives from all colleges with approved programs, with advisory input from the program faculty.

Degree Program	Hours in Approved IGSP Courses
Master's in home department, minor in Statistics	9
Master's in home department, M.S. in Statistics*	24
Doctorate in home department, minor in Statistics	15

Doctorate in home department, M.S. in Statistics* 24

*The M.S. in Statistics requires 33 hours.

Course options consist of courses in statistics, offered either by the Department of Statistics or by other departments, which have been reviewed and approved by the IGSP Executive Committee. Students taking an M.S. in Statistics must pass the two-part comprehensive examination covering statistical theory and methods. Students taking a minor in Statistics in conjunction with a doctorate in another field must pass a written comprehensive examination in Statistics, constructed and evaluated by the student's Examination Committee. No formal comprehensive examination is required of students earning a Statistics minor along with a master's in another field beyond questions which the home department wishes to include as part of the comprehensive examination for the master's degree.

General Admissions and Degree Requirements

1. The student's home department must have approved a program of courses with the Executive Committee. That program will specify the sequences of statistics courses, chosen from the IGSP approved list, that are considered appropriate by the home department. Students who wish to participate in this program should contact their college representative or the Chair of IGSP in the Department of Statistics.
2. The student's graduate committee must include a member of the IGSP faculty. For students seeking doctoral degrees or the M.S. in Statistics, the committee member must be a faculty member in the Statistics Department.
3. The student's Admission to Candidacy form must contain all courses required for the chosen degree program set off in a group and labeled "Statistics Courses Required for the Minor or M.S. in Statistics." Should the student not decide to apply for admission to the program until after completion of some of the courses, the student's major professor should file a program change with the cooperating departments and assist the student in obtaining a Department of Statistics faculty member to serve on the student's graduate committee.

Successful completion of the Statistics M.S. or minor is recognized by appropriate documentation on the student's transcript. Students who do not complete the requirements of the minor or M.S. will still receive academic credit for the statistics courses they have successfully completed.

For information contact
msyounger@utk.edu or http://
www.bus.utk.edu/stat/igsp.

BUSINESS ADMINISTRATION CONCENTRATION

For complete listing of program requirements, see Business Administration. **Ph.D. Concentration:** Statistics

This degree provides students with a broad knowledge of the field of statistics, the ability to apply statistics in practical situations to problems of business and industry and the ability to develop new statistical methods; all of which takes place while students are

exposed to coursework in the basic functional areas of business.

Minimum course requirements are: 592, 662, 663, 664, 691, and two courses chosen from 666, 673, 674, 679.

CERTIFICATE IN APPLIED STATISTICAL STRATEGIES

The Department of Statistics offers a certificate program in applied statistical strategies. The program is designed for the part-time student, and several of the courses are offered through distance education.

The 12-credit certificate is available by completing two required courses, 571-72, and two electives selected from the following: 573, 575, 579, and 585 or 566 or other graduate statistics courses as approved by the Statistics Graduate Program Committee chair.

ACADEMIC STANDARDS

A graduate student in the College of Business Administration whose grade-point average falls below 3.0 will be placed on probation. A student on probation will be dropped from the program unless his/her cumulative graduate grade-point average is 3.0 or higher at the end of the probationary period. The probationary period is defined as the next semester's coursework as established by the degree program for full-time students and the next two semesters' coursework as established by the degree program for part-time students.

GRADUATE COURSES

472 Regression Analysis (3) Linear regression and correlation, multiple regression, polynomial regression, selection of variables, use of dummy variables, analysis of residuals. Logistic regression and its applications. Matrix formulation of model. Use of standard computer packages. Prereq: Regression and Correlation Methods.

473 Experimental Design and Analysis (3) Design and analysis of single factor and many-factor studies. Residual analysis and checking assumptions. Transformations. Sample size determination and power analysis. Analysis of variance for complex experiments. Fractional factorial and incomplete block designs. Use of standard computing packages. Prereq: Experimental Methods.

500 Thesis (1-15) P/NP only. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

511 Statistical Thinking for Decision Making (3) Concepts regarding collecting, organizing, and drawing conclusions from data. Sampling, experimentation, and measurement. Descriptive statistics. Cross-classified data. Correlation and causation; regression and prediction. Statistical reasoning. Prereq: Admission to College of Business Administration master's program. Not available for Statistics majors.

531 Survey of Statistical Methods I (3) Univariate and bivariate data collection and organization, statistical estimation and hypothesis testing; analysis of relationships for categorical and numerical data, including Chi-square tests and simple linear and quadratic regression. Use of computing facilities required. Credit not given for both 531 and 537. Prereq: 1 yr. college mathematics. F,Su

532 Survey of Statistical Methods II (3) Multiple linear regression, including use of dummy variables; single and multiple factor analysis of variance and covariance; issues in experimental design and analysis. Use of computing facilities required. Prereq: 531. Sp

537 Statistics for Research I (3) Principles and application of statistical methodology, integrated with considerable use of major statistical computing system. Probability and probability distributions, forming and testing hypotheses using parametric and nonparametric inference methods. Matrix-based simple linear regression and correlation. Credit not given for both 531 and 537. Prereq: 1 yr undergraduate mathematics and 1 undergraduate statistics course. F

538 Statistics for Research II (3) General linear model as applied to multiple regression and analysis of variance. Diagnostic and influence techniques. One-way, factorial, blocking, and nested designs, preplanned versus post-hoc contrasts. Random factors and repeated measures. Prereq: 537 or 532. Sp

561 Introduction to Computing for Data Management and Analysis (1) UT computing environment for beginning statistics graduate students. Use of operating system commands, system editor, utility programs and SAS statistical package for data entry and editing, file management and statistical analysis. Use of UTCC computing facilities required. Coreq: 531, 537 or 571, or consent of instructor. F

563 Introduction to Mathematical Statistics (3) Basic probability models and theory of distributions of random variables. Prereq: Mathematics 241. F

564 Theory of Statistical Inference (3) Introductory theory underlying common statistical procedures of hypothesis testing and estimation. Prereq: 563. Sp

566 Statistical Techniques in Industrial Processes (3) Applications of control charts and other statistical techniques in industrial setting. Attributes and variables control charts, process capability analysis, aspects of sampling, statistical tolerancing, estimation of variance components, problems of measurement, special industrial applications. Prereq: 571 or equivalent. F

567 Analysis of Lifetime Data (3) Statistical analysis of life data. Methods of analysis for complete and censored data. Life data regression. Analysis of accelerated life tests. Prereq: 563 or Mathematics 425. F

571 Statistical Methods (3) Applied statistical methods: estimation, tests of hypotheses, analysis of variance, nonparametric methods. Prereq: 251. F,Su

572 Applied Regression Analysis (3) Simple linear regression. Matrix approach to multiple linear regression. Partial and sequential sums of squares, interaction and confounding, use of dummy variables, model selection. Leverage, influence and collinearity. Autocorrelated errors. Generalized linear models, maximum likelihood estimation, logistic regression, analysis of deviance. Nonlinear models, inference, ill-conditioning. Robust regression, M-estimators, iteratively reweighted least squares. Nonparametric regression, kernel, splines, testing lack of fit. Prereq: 571 and matrix algebra. F,Sp

573 Design of Experiments (3) One-way ANOVA, multiple range tests, equal and unequal variances, transformations; factorial experiments, completely randomized designs, analysis of covariance, split-plot and nested designs, fractional factorials, sequential designs. Prereq: 571. Sp

575 Applied Time Series (3) Fundamental concepts of time series analysis: Box-Jenkins approach, stationary and nonstationary models, forecasting model identification, seasonal models, transfer function models, and spectral theory. Prereq: 538 or 572 or consent of instructor. Sp

578 Categorical Data Analysis (3) Log-linear analysis of multidimensional contingency tables. Logistic regression. Theory, applications, and use of statistical software. Prereq: 1 yr graduate-level statistics, regression analysis and analysis of variance, or consent of instructor. Sp

579 Applied Multivariate Methods (3) Multivariate techniques: Hotelling's T-sq. MANOVA, discriminant analysis, canonical correlation, principal component analysis, and factor analysis. Computer oriented approach: analysis and interpretation. Knowledge of basic matrices and SAS essential. Prereq: 538 or knowledge of regression and analysis of variance. F

583 Special Topics in Applied Statistics (1-3) May be repeated. Maximum 9 hrs.

585 Principles of Statistical Process Management (1-3) Statistical and other techniques applied to management of organizational processes. Prereq: Consent of department head.

587 Graduate Seminar (1) Directed readings and active participation in colloquium program of Department of Statistics and of student's minor program. Prereq: Consent of statistics department director of graduate studies. May be repeated. Maximum 2 hrs. S/NC only. F

592 Internship (1-6) Supervised off-campus experience in application of statistical principles and methods in business, industry, or government. Written and oral report. Prereq: 4 courses in graduate-level statistics or consent of statistics department director of graduate studies. May be repeated. Maximum 6 hrs. S/NC only.

593 Independent Study (2-6) Faculty directed readings and investigation of specified topic in probability or statistics. Written report and oral presentation. Prereq: 2 courses in statistics and consent of the statistics department director of graduate studies. May be repeated. Maximum 6 hrs. S/NC or letter grade.

595 Statistical Consulting Practicum (1-6) Supervised experience helping on-campus researchers plan, manage data, and develop and perform analyses specific to designs and hypotheses. Discussion of activities in regular seminar meetings. Final written reports and/or detailed diaries. Prereq: 572 or 538. May be repeated. Maximum 6 hrs.

600 Doctoral Research and Dissertation (3-15) P/ NP only. E

662 Computational Methods in Statistics (3) Up-to-date computational methods in statistics: open architecture interactive computational languages supplemented by other statistical packages with graphical capabilities. Statistical computing, numerical methods for linear models and generalized linear models, non-linear statistical methods, matrix computations and special matrices, essentials of Monte Carlo simulation, and resampling techniques. Prereq: Knowledge of programming language and 572 or consent of instructor.

663 Advanced Statistics Theory I (3) Univariate models and theory of distributions, general theory of estimation and method of maximum likelihood, sufficient statistics, small and large sample efficiency of estimators, and confidence and tolerance intervals. Context of series of significant problems in applied statistics. Prereq: 564 and Mathematics 445.

664 Advanced Statistics Theory II (3) Testing statistical hypotheses, Bayesian methods and estimation, linear model theory and model selection. Prereq: 663.

666 Advanced Statistical Process Control (3) Development of advanced SPC concepts: theory governing properties of Shewhart-type control charts. Comparisons with competing methodologies. Readings and discussion based on current literature. Prereq: 564 and 566.

673 Advanced Topics in Design of Experiments and Linear Models (3) Experimentation for product and process improvement: response surface methodology and robust design methods; mixture experiments; optimal design topics; distribution theory and inference for linear models. Prereq: 573 or consent of instructor.

674 Advanced Data Mining (3) Interacting roles of statistical learning and data mining. Statistical data structures, measurement, visualization and exploration. Multidimensional scaling, classification methods, decision trees, neural networks, association rules and market basket analysis. Cluster analysis. Bayesian clustering, evaluation and selection of models and information criterion. Boosting and bagging. Support vector machines, optimization, search methods, and algorithms. Prereq: 564, 579 or equivalent, and knowledge of programming language, or consent of instructor.

677 Statistical Modeling (3) Modern techniques of statistical modeling: predictive, likelihood, Bayesian, and information-based model selection and evaluation paradigms. Application of techniques in various types of models for both continuous and discrete data modeling problems. Interactive computational tools. Prereq: 564 and 572 or 538, or consent of instructor.

679 Multivariate Statistical Modeling (3) Modern information based techniques and model selection in multivariate analysis, informational tests of significance with multivariate data, multivariate analysis of variance, multivariate regression and variable selection, multisample cluster analysis, common principal component model, factor analysis model, covariance structural models with latent variables, mixture-model cluster analysis. Prereq: Matrix algebra and 564, or matrix-based linear models with experience in interactive computing, or consent of instructor.

683 Special Topics in Statistics (1-3) Presentation of specialized topics in statistics. May be repeated. Maximum 6 hrs.

691 Graduate Seminar in Applied Statistics (3) Reading of literature and discussion of open problems of importance to industry: design of experiments, modeling, process control, regression, and reliability. Prereq: Consent of instructor. S/NC or letter grade.

693 Independent Study (1-6) Directed research on subject of mutual interest to student and faculty member. May be repeated. Maximum 6 hrs.

Theatre

(College of Arts and Sciences)

MAJOR

Theatre M.F.A.

Blake Robison, *Head*

Professors:

Black, W., M.F.A. Illinois
Custer, M., M.F.A. Wisconsin
Lester, L. W., Ed.D. Tennessee

Associate Professors:

Craven, E. H., M.A. Tennessee
DeCuir, L. J. (Liaison), M.F.A. Tulane
Gould, B. K., M.F.A. Catholic
Weber, T., M.F.A. Alabama

Assistant Professors:

Gabriel, D., M.F.A. Ohio State
Heil, M., M.F.A. Texas
Speas, B., M.F.A. Virginia
Van den Berg, Klaus, Ph.D. Indiana
Yeager, K., B.F.A. Penn State

The Department of Theatre offers the Master of Fine Arts degree with a major in Theatre, concentrations in costume design, performance, lighting design, scene design, and theatre technology. Not all areas of concentration accept applicants every year.

UT Theatre maintains an active presence on the international theatre scene through the engagement of distinguished guest artists, touring to foreign theatre festivals, participation in international conferences, and other educational initiatives.

Applicants must have completed undergraduate degrees approximately equivalent in requirements to those specified for degrees conferred by The University of Tennessee.

Three letters of recommendation and interviews with appropriate faculty are required of all applicants. Applicants for admission to the M.F.A. design/technical theatre programs must submit samples of their work. Auditions are required of M.F.A. degree performance applicants.

For detailed information about the graduate program, contact the Director of Graduate Studies, Department of Theatre.

THE MASTER OF FINE ARTS PROGRAM

At least 60 semester hours, 40 of which must be at the 500 level or above, are required for the degree of Master of Fine Arts with a major in Theatre, which is normally to be completed in three consecutive years of full time residence. Theatre 501 is required the first year of residence. Three additional hours at the 500 level are required from history, literature, or dramaturgy. Students in the M.F.A. degree program are evaluated annually by juried performance or portfolio submission. Continuation in the program is with the approval of the faculty committee for the M.F.A. degree program. Theatre 599, Projects in Lieu of Thesis, and an oral defense of the project must be completed satisfactorily before the degree is conferred.

In addition to the core requirements listed above, each area of concentration has specific requirements:

Design/Technical Production

Required courses are at least 12 hours of Theatre 580, Design and Technical Production Seminar, and at least 6 hours in the projects courses. Theatre 401, Principles of Design is required in the first year of residence.

Performance

At least 12 hours each of 520 Master Class in Performance: Acting; 523 Master Class in Performance: Movement; and 525 Master Class in Performance: Voice. Coursework in this concentration is conducted in a conservatory environment. In the third year, students are expected to intern with either the resident professional Clarence Brown Theatre Company or another regional professional theatre.

REQUIREMENTS FOR SECOND MASTER'S DEGREE

Students admitted to the MFA program who have already earned a master's or a doctoral degree may apply up to 12 credit hours from the previous graduate program to the MFA degree with approval of the student's committee, the Dean of the College of Arts and Sciences, and the Dean of Graduate Studies.

Any such credits applied from a previous graduate program would be from courses that are directly relevant to the student's MFA curriculum and must have been earned within the time limit (6 years) established for completion of the MFA degree.

GRADUATE COURSES

401 Principles of Theatrical Design (3) Visual and structural relationships in theatrical design.

409 Stage Make-up (3) Study and problems in make-up design and application: character analysis. Prereq: Introduction to Theatre.

420 Special Studies in Acting (3) Content varies. Exercises in selected concentrated areas such as styles, techniques, approaches, e.g., Shakespeare, movement, humor. Prereq: Advanced Acting and consent of instructor. May be repeated. Maximum 9 hrs.

425 Selected Musical Theatre Techniques (2) Study and practice of musical theatre material: dance and vocal work. May be repeated. Maximum 4 hrs.

430-31 Principles of Play Directing (3,3) Problems in composition, picturization, rhythm, movement. Prereq: Acting. Must be taken in sequence.

440 Advanced Theatre Costume Design (3) Costume as expressive element in dramatic production. Prereq: 340.

445 Advanced Costume Construction (3) Advanced studies in construction technique, tailoring, vacuum forming, plastic molding, and cobbling. Prereq: 345 or consent of instructor.

446 Costume Patterning (3) Draping patterns for period costumes. Corsetry and study of historic patterns 1500-1900. Prereq: 345 or consent of instructor.

450 Advanced Scenery Technology I (3) Study and practice of theatre woodworking; production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

451 Advanced Scenery Technology II (3) Study and practice of metalworking and plastics for theatrical productions; production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

452 Advanced Scenery Technology III (3) Study and practice of stage rigging for theatrical productions; production participation required. Prereq: 250. Graduate credit to theatre M.F.A. students only.

454 Scenery Painting (2) Introduction to materials, techniques, and principles of craft. Gaining skill and understanding through studio experience. Prereq: Consent of instructor.

456 Rendering (3) Techniques in monochrome and full color illustration of space and form. Prereq: Acquaintance with basic mechanical perspective and freehand sketching.

462 Advanced Lighting Design (3) Advanced problems in lighting design and theory, lighting musical theatre, opera, and dance. Prereq: 362 or consent of instructor.

464 Computer Assisted Design for Theatre (3) Advanced techniques in computer assisted design for theatre. Work with CAD, Computer Drawing, Graphics, and/or 3D Modeling software for preparation of theatrical designs. Specific content varies with semester. Admission by consent of instructor only. May be repeated. Maximum 9 hrs.

470 Playwriting (3) Advanced instruction in writing of plays. Prereq: Consent of instructor.

491 Foreign Study (1-15) See College of Arts and Sciences.

492 Off-Campus Study (1-15) See College of Arts and Sciences.

493 Independent Study (1-15) See College of Arts and Sciences.

501 Introduction to Graduate Research in Theatre (3) Research tools and methods for theatre artist and scholar.

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

510 Studies in Theatre History (3) Intensive study of selected topics in theatre history. May be repeated. Maximum 9 hrs.

512 Dramatic Literature Analysis (3) Dramaturgical strategies of major playwrights, using variety of analytical approaches from Aristotelian to deconstruction.

520 Master Class in Performance: Acting (3) Master class in acting techniques. Theatre MFA students only. May be repeated. Maximum 18 hrs.

523 Master Class in Performance: Movement (3) Master class in movement techniques. Theatre MFA students only. May be repeated. Maximum 18 hrs.

525 Master Class in Performance: Voice (3) Master class in voice and speech techniques. Theatre MFA students only. May be repeated. Maximum 18 hrs.

536 Projects in Play Directing (3) Practical work in play direction involving various lengths and kinds of scripts. May be repeated. Maximum 9 hrs.

542 The Social History of Costume (3) Study and analysis of costume as related to society's manners and mores, architecture and furniture.

543 Projects in Costume Design (1-3) Problems of play interpretation and theatrical costume design and production. Design costumes for complex plays for public performance. Prereq: Consent of department. May be repeated. Maximum 9 hrs.

545 Millinery for the Stage (2) Pattern making and construction techniques for hats from antiquity to present. Prereq: Consent of instructor.

546 Advanced Costume Patterning (3) Advanced studies in patterning period costume. Development of historic patterns through flat pattern method. Prereq: 446.

547 Painting and Dyeing for the Theatre (3) Fibers, dyes and dye processes; color matching and distressing.

549 Projects in Costume Technology (1-3) Individualized studies in costume technology in theatre production. Prereq: Consent of instructor. May be repeated. Maximum 6 hrs.

550 Projects in Technical Theatre (1-3) Problems of set design interpretation and execution. May be repeated. Maximum 9 hrs.

551-552 Structural Design for Stage (3,3) Application of advanced theatre technology and analysis of common building materials to design of safe stage scenery. Must be taken in sequence.

553 Projects in Scenic Design (1-3) Conception and completion of major projects, both hypothetical and actual, in scene design. May be repeated. Maximum 9 hrs.

554 Studies in Scenic Design (3) Advanced scene design techniques and approaches to design for complex dramas and varied dramatic forms. May be repeated. Maximum 6 hrs.

555 Model Building (3) Techniques of model building for scenic designer. Theatre MFA students only. Prereq: 401 and one semester of 580.

556 Drafting (3) Drafting techniques for scenic designer. Theatre MFA students only.

560 Projects in Lighting Design (1-3) Conception and completion of major projects, both hypothetical and actual, in lighting design. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs.

562 Special Problems in Lighting Design (3) Advanced problems in lighting design and theory, problems in Broadway production and touring. Prereq: 462 or consent of instructor.

580 Design and Technical Production Seminar (1-6) Selected aspects of design and technical production. Prereq: Consent of instructor. May be repeated. Maximum 18 hrs.

581 Technical Design (3) Technical problems and solutions in scenery construction using traditional and modern techniques with application of unusual materials, consideration of budgeting, safety, and structural integrity. Prereq: 551-552.

582 Production Planning (3) Theatre management techniques useful in structuring orderly, effective production: survey of applicable computer programs.

583 Stage Machinery (3) Design of safe, effective machinery for movement of stage scenery. Prereq: 551-552.

585 Production Workshops (1-6) Directed experience in production collaborations. Prereq: Consent of instructor. May be repeated. Maximum 12 hrs.

599 Project in Lieu of Thesis (1-6) Available to theatre MFA students only. Prereq: Minimum of 30 hrs toward MFA degree and consent of advisor. May be repeated. Maximum 9 hrs.

Theory and Practice in Teacher Education

(College of Education)

MAJORS

Education M.S., Ed.S., Ed.D., Ph.D.

L. Knight, *Head*

Professors:

Benner, Susan M., Ed.D. Columbia
Brozo, William G., Ph.D. South Carolina
Christensen, Mark A. (Emeritus),

Ph.D. Kansas

Davis, A. R., Ph.D. Ohio State

Davis-Wiley, Patricia, Ed.D. Houston

Hargis, Charles H. (Liaison),

Ed.D. Colorado State

Harris, G. A., Jr. (Emeritus), Ph.D. Michigan

Hatch, J. Amos, Ph.D. Florida

Huff, P. (Emeritus), Ph.D. Ohio State

Hull, Howard N. (Emeritus), Ed.S. Peabody

Jost, Karl J., Ed.D. Oklahoma

Knight, Lester N., Ph.D. Texas

Lindsey, LaVerne B., Ed.D. Mississippi State

Long, Vena M., Ph.D. Missouri (Columbia)

Rowell, C. Glennon, Ed.D. George Peabody

Schindler, W. Jean, Ph.D. Kent State

Turner, T. N., Ed.D. Penn State

Watkins, J. Paul (Emeritus), M.S. Tennessee

Associate Professors:

Barclay, McLaughlin, Ph.D. Michigan

Cagle, Lynn C., Ed.D. Georgia

Chance, Charles A., Ph.D. Ohio State

Gilrane, Colleen P., Ph.D. Illinois

Hannum, Michael C.,

Ed.D. Northern Colorado

Hodge, R. L., Ph.D. Texas

Judge, Sharon L.,

Ph.D. California (Santa Barbara)

Melear, Claudia T., Ph.D. Ohio State

Puckett, Kathleen S., Ph.D. Tennessee

Assistant Professors:

Bell, Sherry M., Ph.D. Tennessee

Hendricks, D. A., Ph.D. Alabama

Rearden, Kristin T., Ph.D. Texas A&M

Taylor, Mark P., Ph.D. Missouri

The Department of Theory and Practice in Teacher Education offers graduate programs leading to degrees, majors, and concentrations in:

Master of Science Education

Track 1-art education

Track 1-elementary education

Track 1-English education

Track 1-foreign language/ESL education

Track 1-mathematics education

Track 1-modified and comprehensive special education

Track 1-reading education

Track 1-science education

Track 1-social science education

Track 1-special education: early childhood
 Track 2-art education
 Track 2-elementary teaching
 Track 2-modified and comprehensive special education
 Track 2-secondary teaching
 Track 2-special education: early childhood

Education Specialist

Education

Elementary education
 English education
 Foreign language/ESL education
 Mathematics education
 Reading education
 Science education
 Social science education

Doctor of Education

Education

Literacy, language education, and ESL education
 Teacher education

Doctor of Philosophy

Education

Early childhood education
 Literacy, language education, and ESL education
 Teacher Education

See Education under Fields of Instruction for full description of all degree requirements. The department also houses programs for students seeking licensure in early childhood, primary, and middle school education (grades K-8 and 1-8), reading endorsement, special education licensure, and secondary social studies. Early childhood licensure and degree programs are also available through the College of Human Ecology.

The department houses three areas of interest: holistic teaching/learning, early childhood education, and secondary content teaching.

The holistic teaching/learning area's central emphasis is on holistic, integrative, and interdisciplinary teaching/learning as opposed to teaching disciplinary subject content (e.g., science, mathematics, language arts) as separate entities. The focus on integration is similar to how children learn and how language is central to the teaching/learning process. The faculty believe that students should be prepared as teachers who can facilitate learning rather than merely dispense content. Central to the philosophy of holistic teaching and learning is knowing each individual child's learning style, abilities, and interests.

The early childhood education area is focused on the preparation of teachers for the education of all young children in inclusive settings. The context in which children live (i.e., urban, rural) influences their development and learning. Young children are defined as children from birth to age eight, including children living in poverty, those of color, with disabilities, with advanced development and typically developing children.

The secondary content teaching area's mission is the preparation of teachers for instruction in art, ESL, English, foreign language, mathematics, social science and science. The emphasis is on how these disciplines are taught in context of different cultures.

Art Education

GRADUATE COURSES

510 History and Philosophy of Art Education (3) United States from 1860's to present. Prereq: Consent of instructor.

520 Studies in Art Education (3) Issues and topics current to the field of art education. Prereq: Consent of instructor.

530 Production and Critical Analysis of Art (3) Relationship of production and critical analysis of works of art to discipline-based art education.

540 Use and Construction of Instructional Materials for Teaching Art (3) Examination and construction of curriculum and instructional aids related to teaching strategies in art education.

Early Childhood Education

GRADUATE COURSES

445 Early Childhood Education: Program Development and Teaching in Kindergarten (3) Curriculum planning, classroom organization and management practices for teaching young children; relationship of kindergarten to total elementary school. Prereq: Admission to teacher education. E

471 Early Childhood Special Education (6) Assessment, curriculum planning and development and teaching approaches used in early childhood special education. Prereq: Admission to teacher education. F

515 Seminar (1-3) Curriculum, instructional technology, elementary education, secondary education, or social foundations as related to goals of students' programs. May be repeated. Maximum 6 hrs. S/NC only. E

554 Assessment in Early Childhood Special Education (3) Development of knowledge and skills in appropriate formal and informal assessments of handicapped infants and young children: screening, identification, diagnosis, placement and programming assessment issues. Prereq: 553 or consent of instructor.

566 Curriculum for Early Childhood Education (K-3) (3) Theoretical foundations and current research in content and skill areas of curriculum for kindergarten-grade 3; application to local school setting. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. Sp,Su

567 Application of Theory in Early Childhood Education (K-3) (3) Principles and practices from selected theoretical orientations. Prereq: Course in early childhood education or consent of instructor. May be repeated. Maximum 6 hrs. F,Su

568 Early Childhood Special Education: Theories and Interventions (3) Theoretical perspectives of early childhood special education; exploration of programmatic models, family-focused concepts and curriculum development.

584 Seminar in Early Childhood Education (3) Analysis of research and theory in early childhood education; educative process of young children. Prereq: Course in early childhood education. May be repeated. Maximum 6 hrs. Sp,Su

650 Advanced Studies in Early Childhood Education (3) Prereq: 2 graduate courses in early childhood education and consent of instructor. May be repeated. Maximum 6 hrs. S/NC only. E

Elementary Education

Note: See Mathematics, Reading, Science, and Social Science Education for additional Elementary Education courses.

GRADUATE COURSES

421 Elementary and Middle School Science and Social Studies Instruction (3) Methods and materials for teaching science and social studies. Development of functional relationships and entities of two fields. Not open to students with recent course or background in teaching science and/or social studies. Prereq: Admission to teacher education. F,Sp

429 Language Arts/Reading Instruction in Elementary and Middle Schools (3) Language and language development as applied to teaching of oracy (listening-speaking) and aspects of literacy (reading process/readiness and writing). Not open to students with recent course in language arts methods. Prereq: Admission to teacher education. F,Sp

504 Studies and Theory in Language Development (3) Studies and theory of language development in children. Prereq: 1 elementary school language arts course or consent of instructor. F

505 Elementary and Middle School Teaching Methods II (6) Applied methods of teaching reading, language arts, science, social studies and mathematics: accommodation strategies for students with diverse needs. Prereq: Elementary and Middle School Teaching Methods I. Coreq: 575. F

523 Diagnosis and Correction of Children's Difficulties in Learning Mathematics (3) Children's difficulties in learning mathematics and procedures for helping classroom teacher correct difficulties. Prereq: 522 or equivalent or consent of instructor. Sp

524 Teaching for Creative Thinking and Expression (3) Creativity of teacher and development of student creativity. Development of creative potential across academic curriculum. Creative problem solving and methods for development of creative potential. Su

527 Elementary School Curriculum (3) Examination, evaluation and application of curriculum designs in elementary school. Trends and issues which affect elementary education. Prereq: Consent of instructor. F,Su

528 Teaching Language Arts Elementary and Middle School (3) Recent trends and current materials and methods in teaching elementary language arts (except reading). Prereq: Course in language arts or consent of instructor. Sp,Su

529 Practicum in Diagnosis and Remediation of Difficulties in Learning Mathematics (3) Assessment and practicum experience with children having difficulties in learning elementary school mathematics. Prereq: 523 or consent of instructor. Su

550 Assessment and Correction of Language Arts Difficulties (3) Procedures and materials for diagnosing and correcting language arts difficulties; analysis of children's work. Prereq: At least one language arts course or consent of instructor. Su

606 Research in Elementary Education (3) Analysis of research in elementary education with application to classroom teaching. Prereq: Research course. Su

651 Advanced Studies in Elementary School Language Arts (3) Selected issues in elementary school language arts. Prereq: Graduate course in elementary school language arts or consent of instructor. Sp

English Education

GRADUATE COURSES

459 Teaching English in the Secondary School (3) Techniques of teaching composition, language, and literature. Prereq: Admission to teacher education.

460 Teaching Reading and Literature in the Secondary School (3) Approaches for teaching basic reading skills and ways of teaching literature. Sp

507 Teaching Poetry Grades 7-12 (3) Research and theory in application to teaching of poetry. Design of strategies and materials for teaching and writing and reading of poetry. Review of texts and materials. F

508 Teaching Composition in the Secondary School (3) Teaching narration, description, exposition, and

argumentation; writing process and marking of student papers. Sp

509 Teaching Fiction in the Secondary School (3) Teaching of novels and short stories. F

521 Interdisciplinary Aesthetics (3) Discussions, visual and audio presentations concerned with aesthetic considerations of areas of study: geography, history, physics, literature, languages, music, visual arts and drama.

590 Seminar in Teaching English in Secondary Schools (3) Content varies. Theoretical and practical approaches to teaching English in secondary school. May be repeated. Su

592 Linguistics and the Teaching of English (3) Grammar, usage, semantics, dialectology, history of language, and lexicography. Su

597 Teaching Drama Grades 7-13 (3) Strategies and materials for teaching creative dramatics, enacting and writing of plays, reading of scripts. Sp

598 Developing Speaking and Listening Skills, Grades 7-12 (3) Teaching approaches to nonverbal communication, interpersonal and group communication, public address and listening. Review of tests and materials. Sp

601 Studies in English Education (3) Issues and research in teaching of English. Su

Foreign Language/ESL Education

GRADUATE COURSES

455 Teaching of Foreign Languages, Grades 7-12 (3) Instructional methods, lesson planning, peer-teaching; materials for teaching foreign language and culture; evaluation techniques. Required for certification in modern foreign languages and Latin. Prereq: Completion or near completion of foreign language hours for certification and Admission to teacher education.

555 Foreign Language in the Elementary Schools Practicum (3) Experiences designing, implementing and assessing second language instruction in elementary school setting. Prereq: 587 or consent of instructor.

556 English as a Second Language Practicum (3) Experiences designing, implementing and assessing English instruction to non-native English speakers. Required course for ESL certification. Prereq: 578 or consent of instructor.

578 Teaching English as a Second Language (3) Instructional methods; utilization of assessment procedures to diagnose English linguistic proficiency; materials for non-native speaker in K-12 classroom. Required for Tennessee ESL (K-12) licensure. Prereq: 587 or consent of instructor. Sp

587 Teaching Foreign Languages in Secondary Schools (3) Advanced instructional techniques and evaluation procedures: materials analysis and preparation; trends, issues, and research in modern foreign languages and Latin. Prereq: Consent of instructor.

678 Advanced Studies in English as a Second Language (3) Research, curricula, assessment, trends and issues in English as a second language. Prereq: 578 or consent of instructor.

687 Advanced Studies in Foreign Language Education (3) Research, curricula, assessment, trends and issues in foreign language education. Prereq: 587 or consent of instructor.

Mathematics Education

GRADUATE COURSES

485 Teaching Mathematics, Grades 7-12 (3) Preparation of teaching plans, evaluation, materials for teaching mathematics; teaching simulation and di-

rected observation in schools. Prereq: Admission to teacher education. F

522 Programs and Materials in School Mathematics (3) Examination, development and use of materials for creating an active learning environment for learning mathematics for all ages. Prereq: 485, 530, 543, or equivalent. Su

530 Teaching Mathematics to Young Children: K-4 (3) Unit planning, daily planning, grouping and other strategies of teaching mathematics. For those with little preparation in teaching elementary school mathematics. F

543 Teaching Mathematics in Middle School: 5-8 (3) Unit planning, daily planning, grouping and other strategies of teaching mathematics. For those with little preparation in teaching middle school mathematics. F,Su,A

550 Mathematics Assessment (3) Processes for assessing, making curricular and instructional decisions based upon and reporting student achievement. Interpretation and use of existing assessment data. Methods of assessment: traditional tests, performance tasks, portfolios, exhibitions. Prereq: 581 or equivalent. Sp,A

581 Mathematics Curriculum (3) Past, present and future issues influencing mathematics curriculum in schools, elementary through college. Teacher's role in curriculum development and implementation. Rationales for curriculum decisions. Prereq: 485, Elementary Education 505, or equivalent. Su

583 Teaching Mathematics in Senior High Schools and Community Colleges (3) Topics appropriate for high school and community/junior college mathematics curriculum. Special problems related to enrichment, problem solving, and use of microcomputers. Opportunities for special projects. Prereq: 485 or equivalent. F,A

622 Research Trends in Mathematics Teacher Education (3) Analysis of current research trends in mathematics teacher education and impact of such research on development of teachers both preservice and inservice. Prereq: Minimum 9 hrs of 500-level Math Ed courses.

683 Advanced Studies in Mathematics Education (3) Analysis of current research in mathematics education and implications of research for classroom practice. Prereq: Two graduate courses in mathematics education.

Reading Education

GRADUATE COURSES

430 Elementary and Middle School Developmental Reading Instruction (2-3) Word recognition (including phonics), comprehension, evaluation, and materials. Not open to students with recent course in reading methods. Prereq: Admission to teacher education. F,Sp

434 Topics in Reading Education (1-6) Prereq: Admission to teacher education and course in reading education. May be repeated. Maximum 6 hrs. E

461 Developing Reading Skills in Content Fields (3) Techniques for teaching reading and study skills in content areas of school program. Extensive assessment of textbooks. Middle school and high school. E

530 Teaching Reading in Elementary and Middle Schools (3) Trends in methods, materials, basic approaches, skill development and assessment procedures for teaching reading at elementary school level. Prereq: Course in teaching of reading or consent of instructor. F,Su

533 Reading in Community College: Research and Theory (3) Analysis of components of effective community college reading programs. Attention to research bases. Prereq: Course in reading education or consent of instructor. Su

534 Seminar in Reading Education (1-6) May be repeated. Maximum 6 hrs. E

536 Psychology of Reading (3) Reading act, relationship between learning theory and reading, role of reading in child's overall intellectual development. Affective and cultural factors. Prereq: 500-level course in reading education or consent of instructor. F

537 Diagnosis and Correction of Classroom Reading Problems (3) Procedures, methodologies and materials for diagnosing and correcting classroom reading problems. Prereq: Course in reading education, or equivalent teaching experience, or consent of instructor. Sp,Su

538 Practicum in Diagnosis of Reading Problems (3) Theoretical and practical applications of specific reading diagnostic instruments; testing of elementary and/or secondary school students, preparing case study reports, and conducting parent conferences. Prereq: Course in diagnosis and correction of classroom reading problems or consent of instructor. Sp

539 Practicum in Remediation of Reading Problems (3) Application of learning and teaching methodology in working with elementary and/or secondary school students on one-to-one or small group basis. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. Sp

540 Teaching the Struggling Adolescent Reader (3) Methods of teaching middle and high school students who do not have sufficient reading skill to successfully engage in required reading. Prereq: Course in reading education, or equivalent teaching experience, or consent of instructor.

554 Developmental Reading Practicum (3) Diagnosing and teaching children having developmental and corrective reading needs in regular classroom. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. Sp

602 Seminar in Reading Education (1-6) May be repeated. Maximum 6 hrs. E

603 Advanced Studies and Theoretical Models of Reading (3) Research on reading processes. Current theoretical models related to how learners process print. Prereq: 500-level courses in reading education or consent of instructor. Sp

605 Organizing and Administering Reading Programs (3) Diagnosing and teaching children having developmental and corrective reading needs in the regular classroom. Prereq: Course in diagnosis and correction of reading problems or consent of instructor. Sp

Science Education

GRADUATE COURSES

496 Teaching Science Grades 7-12 (3) Methods, materials, recent trends in science and environmental education programs for secondary schools. Prereq: Admission to teacher education. F

506 Science Education Studies in Natural Environments (1-3) Systematic study of nature for K-16. Inquiry-based instruction in off campus natural setting. Group and individual observational and empirical studies. Web-based lesson plans designed upon return to campus. May be repeated. Maximum 9 hrs.

531 Teaching Science in Elementary and Middle Schools (3) Recent trends in methods, materials and content in teaching elementary school science. Prereq: Course in teaching elementary school science or consent of instructor. Su,F

565 Instructional Trends and Issues in Science Education (3) Analysis of current trends in science instruction, instructional issues facing elementary, secondary, and community college science teachers, and application of learning theory to teaching biological, physical, and environmental sciences. Prereq: 496, teaching methods, or equivalent. Su

572 Nature of Mathematics and Science Education (3) Teaching and assessment of mathematics and science based upon student conceptions of nature of mathematics and science. Su

596 Curriculum Trends in Science Education (3) Analysis of elementary and secondary curriculum

projects for biological, physical and environmental sciences. Impact of current learning theories on future curriculum development projects. Prereq: 496, or Early Childhood Education 422 Early Childhood Teaching Methods, or equivalent. Prereq or coreq: 565 or consent of instructor. Sp

628 Advanced Studies in Science Education (3) Analysis of current research in science education and implications of research for classroom practice. Prereq: 596. May be repeated. Maximum 6 hrs. Sp,A

696 Research Trends in Science Education (3) Analysis of current research trends in science education and relationship of such trends within broader educational community. Prereq: 628. Sp,A

Social Science Education

GRADUATE COURSES

454 Teaching Strategies and Issues in Social Studies Education (3) Goals, objectives, techniques, materials, and evaluation; directed observation in public schools, preparation of teaching plans and materials; simulated teaching experiences. Prereq: Admission to teacher education.

521 Teaching Social Studies in Elementary and Middle Schools (3) Planning and techniques. Trends in curriculum, development of concepts and generalizations, integration of social sciences. Prereq: Course in teaching of social studies or consent of instructor. Sp

525 Strategies, Programs and Materials for Teaching Elementary Social Studies (3) Analysis of new and innovative social studies program materials and techniques. Exploration of current trends in social studies education. Prereq: Previous course in teaching of social studies or consent of instructor. Sp

585 Teaching Secondary School Social Studies (3) Strategies, projects, materials, and programs in social studies. Prereq: Undergraduate course in teaching of social studies. F,Su

599 Seminar in Social Studies Education (3) Research, trends, and issues in secondary social studies. Su

621 Seminar in Social Studies Research and Theory (3) Status of research and theory. Needed research, related research from other fields, and application of research. Prereq: Recent course in teaching of social studies or consent of instructor. E

Special Education

GRADUATE COURSES

419 Psychology and Education of Students with Mild Disabilities (6) Nature and characteristics of persons with mild handicaps and educational strategies appropriate for these persons. Prereq: Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq: 420. F

420 Field Experience in Modified Programs (3) Practicum in teaching in modified programs: planning, developing, implementing and evaluating instruction. Prereq: Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq: 420. S/NC only. F

431 Field Experience in Comprehensive Programs (3) Prereq: Special Education Principles, Special Education Strategies, and admission to teacher education program. Coreq: 430. S/NC only.

432 Psychology and Education of Students with Moderate/Severe Disabilities (6) Nature and characteristics of persons with moderate/severe disabilities and educational strategies appropriate for those persons. Prereq: Special Education Principles, Special Education Strategies, and admission to teacher education program.

454 Education of the Gifted and Talented Children (3) Orientation to psychometric and behavioral studies of giftedness. Analysis of past and present school practices in reference to curriculum and program implementation. Sp

456 Speech and Language Basis of Learning Disabilities in the Classroom (3) Normal communication development; understanding of speech and language impairments in school-age students; integration of oral/written communication skills into existing curriculum, especially for high incidence special education students.

470 Psychology of the Exceptional Child (3) Varieties of exceptional children; general characteristics and educational needs. Implications of developmental variations for functioning as adults. Opportunity to expand study upon particular exceptionality. Enrollment limited to non-special education majors.

504 Clinical Experience in Teaching and Supervision of Exceptional Children (3-9) Placement in educational settings. May be repeated. Maximum 9 hrs. S/NC or letter grade. (Same as Rehabilitation and Deafness 504.)

506 Internships in Teaching in Special Education and Rehabilitation (3-15) Placement in professional settings in public schools or agencies under supervision of master practitioners. Enrollment limited to those in fifth-year program. S/NC only.

553 Assessment of Exceptional Students (3) Current issues related to assessment; advanced study of evaluation models for special education; dynamic and other innovative assessment approaches; advanced study of application to educational programming; basic statistics and application in assessment.

555 Characteristics of Affective/Motivational Functioning in Children with Disabilities (3) Definition, methods, identification and symptoms of children with affective/motivational development in disabled youngsters. Comparison to normal development and that of children labeled disturbed or behavior disordered.

556 Instructional Systems for Affective/Motivational Education for Children with Disabilities (3) Educational strategies and models of instruction; simulation, demonstration, and media. Teaching techniques, materials, and teacher/pupil/family interactions. Therapeutic forms of education through art, music, role play, puppetry, bibliotherapy, and group interactions. Prereq or coreq: 555 or consent of instructor.

557 Positive Preventive Discipline (3) Instructional, classroom and preventive/proactive strategies for use in classroom which positively effects efficiency of classroom. Research on how curriculum can encourage appropriate interactions of children and youth. Prereq: Admission to graduate program.

558 Neuromuscular and Health Disorders: Educational Implications (3) Neurological impairments, physical disabilities and special health conditions, autism. Investigation of instructional techniques and adaptations.

564 Psychosocial Development of Gifted and Talented Children (3) Phenomena of talent development in context of home, school, and society. Implications of maladjustment. Practices for promoting social and emotional development. Prereq: 451 and 452 or equivalent or consent of instructor.

565 Instructional Systems for the Gifted and Talented (3) Instructional methods and systems evaluated in terms of effectiveness in various educational environments. Prereq or coreq: 564 or consent of instructor.

575 Creative Problem-Solving Strategies for Special Educators (3) Techniques for solving problems encountered by special educators in any setting.

586 Seminar in Research Techniques in Special Education (3) Evaluation of appropriate research methodologies with handicapped populations.

587 Seminar: Issues and Theories in the Education of the Exceptional Child (3) Current trends. Analysis of timely research and theoretical issues. Prereq: Research course or consent of instructor.

590 Application of Microcomputer Technology in Special Education and Vocational Rehabilitation

(3) Application of microcomputer technology with all categories of exceptionalities and across all chronological and functioning age ranges. Microcomputer adaptive software, special switch access, authoring systems, telecommunication, and strategies for cognitive development.

620 Internship in Research in Special Education and Rehabilitation (3-9) Placement with professional engaged in theoretically-based research: public school, institutions, agencies or university settings. Prereq: 9 hrs in statistical and research methods. May be repeated. Maximum 9 hrs. S/NC only.

630 Internship in Institutional Leadership in Special Education and Rehabilitation (3-9) Advanced level field experiences under supervision of practitioner. Prereq: Consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

Theory and Practice in Teacher Education

GRADUATE COURSES

500 Thesis (1-15) P/NP only. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

503 Problems in Lieu of Thesis (2-3) May be repeated. Maximum 9 hrs. S/NC only. E

517 Trends and Issues in Education (3) Examination of contemporary trends and issues in education.

518 Educational Specialist Research and Thesis (3) May be repeated. P/NP only. E

526 Drama and Story Telling in Teaching (3) Use of techniques of drama and storytelling to improve impact of teaching and to teach more effectively. Prereq: Classroom experience or admission to teacher education program.

550 Action Research and Practical Inquiry in Education (3) Principles of action research and practical inquiry for practitioners in early childhood and school settings and methods for conducting such inquiries in professional role. Prereq: Admission to graduate program.

593 Independent Study (1-3) May be repeated. S/NC or letter grade. E

594 Supervised Readings (1-3) May be repeated. S/NC or letter grade. E

595 Special Topics (1-3) May be repeated. S/NC or letter grade. E

596 Clinical Experience in Assessment and Instruction (3) Academic remediation applied in lab/field setting; tasks related to teaching: assessment, preparation of lessons, and delivery of instruction. Coreq: 553. S/NC or letter grade. F

600 Doctoral Research and Dissertation (3-15) P/NP only. E

604 Seminar in Curriculum and Instruction (1) Required 2 consecutive semesters. S/NC only. E

610 Internship in College Teaching and Supervision (3-9) Supervised practice in college teaching and supervision. Prereq: Admission to doctoral program or consent of instructor. May be repeated. Maximum 9 hrs. S/NC only.

617 Trends and Issues in Teacher Education—An Interdisciplinary Perspective (3) Current trends and issues in field of teacher education: elementary education, mathematics education, science education and social science education. Prereq: Admission to doctoral program or consent of instructor. Sp

620 Research in Literacy, Language, and ESL Education (3) Recent trends and historical traditions in language and literacy research: analysis of nature of research methods used, questions asked and topics

studied. Prereq: Admission to doctoral program or consent of instructor.

640 Theoretical Analysis and Theory Construction (3) Critical analysis of paradigms and theories relevant to educational research. Principles of theory construction with grounded, inductive and deductive modes. Construction of mid-range theories. Prereq: Admission to doctoral program.

689 Internship (1-3) Experiences in application of principles and practices of curriculum development and instructional improvement. Prereq: Program prerequisites and consent of instructor. May be repeated. Maximum 9 hrs. S/NC only. E

693 Independent Study (1-3) May be repeated. S/NC or letter grade. E

694 Supervised Reading (1-3) May be repeated. S/NC or letter grade. E

695 Special Topics (1-3) May be repeated. S/NC or letter grade. E

Transportation

See *Marketing, Logistics and Transportation*

Urban and Regional Planning

(College of Arts and Sciences)

MAJOR	DEGREE
Planning	M.S.P.

C. W. Minkel, *Head*

Professors:

Johnson, David A. (Emeritus), Ph.D. ... Cornell
 Kenney, Kenneth B. (Emeritus),
 Ph.D. North Carolina
 Minkel, C. W., Ph.D. Syracuse
 Shouse, Walter L. (Emeritus), M.C.P. Harvard
 Spencer, James A. (Liaison),
 M.C.P. Ohio State

Associate Professor:

Tonn, Bruce, Ph.D. Northwestern

Assistant Professors:

Jepson, Edward, Ph.D. Wisconsin
 Shupp, Teresa, M.S.P. Tennessee
 Zanetta, Maria C., Ph.D. Ohio State

The Department of Urban and Regional Planning offers a program of courses leading to the professional degree of Master of Science in Planning. The degree is the normal route for entry into professional positions in urban and regional planning or related fields. Graduates are candidates for positions in regional, city, county, and metropolitan planning agencies; in local, state, and federal agencies concerned with physical, economic, and administrative planning; in private business and organizations dealing with development problems; and in private consulting.

The Master of Science in Planning program is accredited by the Planning Accreditation Board, a joint undertaking of the American Institute of Certified Planners and the Association of Collegiate Schools of Planning.

THE MASTER'S PROGRAM

Admission Requirements

Applicants are to submit an application for admission to the Office of Graduate Admissions, and two letters of reference from faculty familiar with their prior academic work and a statement describing personal career objectives directly to the department. If the applicant has prior work experience in planning, a reference letter should also be provided by the work supervisor. Graduate Record Examination scores are requested of all applicants whose undergraduate GPA is below 3.0. Other applicants are encouraged to submit them. Students who have not taken an appropriate undergraduate statistics course will be required to take one.

Degree Requirements

The M.S.P. requires completion of at least 48 hours of graduate credit, at least 30 of which must be in planning. The following courses are the core curriculum required of all students: 510, 515, 520, 521, 530, 531, 532, 538 and 540.

Students should plan to enter the program in the fall term to take core courses in the proper sequence.

Each student is required to develop an area of concentrated competence beyond the core curriculum. After selecting the area of concentration, usually by the end of the second semester, the student takes courses from a prescribed set in the subject area. Further enhancement of the concentration is gained by focusing the thesis or major study on the subject. Concentration courses are drawn from the planning curriculum and from other departments in the University. Concentrations are available in land use planning, environmental planning, real estate development planning, and transportation planning.

Students have the latitude to propose an alternate specialization consisting of at least 9 hours of coursework, subject to approval of a faculty committee.

Each student is required to demonstrate competence in individual research. This may be done in one of two ways:

Thesis Option: Complete a thesis for 6 hours credit;

Non-Thesis Option: Complete a major study with acceptable documentation. To be eligible for the major study option, the student must have completed at least 12 hours of graduate coursework in planning with at least a 3.5 cumulative grade-point average. The student meeting these criteria may present a proposal to his/her committee for a major study that will include at least 6 hours of subsequent coursework. The proposal must justify the selection of the topic, describe the approach to the study, and describe the nature of the final product. The topic will normally be expected to reinforce or complement the student's concentration.

Successful completion of a comprehensive exam is required before graduation. The exam will normally be taken after completion of the core requirements in the second year. Based on the material generally used by the American Institute of Certified Planners (AICP), this requirement provides an additional capstone experience as well as preparation for meeting AICP professional certification requirements.

Student academic progress is monitored by the faculty. A student failing to maintain an acceptable grade-point average may be placed on probation or dismissed from the program.

MINOR IN ENVIRONMENTAL POLICY

The department participates in a program designed to give graduate students an opportunity to develop an interdisciplinary specialization in environmental policy. See Economics for program description.

ACADEMIC COMMON MARKET

An agreement among southern states for sharing graduate programs allows legal residents of some states to enroll in certain programs at UT on an in-state tuition basis. The M.S.P. program is available to residents of the states of Arkansas, Virginia, or West Virginia. Additional information may be obtained from the Administrative Services Assistant in the Office of Graduate Admissions.

Planning

GRADUATE COURSES

401 The City in the U.S. (3) Development and character of U.S. cities. Contemporary issues and selected case studies. (Same as Urban Studies 401.)

402 Survey of Planning (3) History of city development and of planning; U.S. experience in urban and other levels of planning. State of the art, process, comprehensive plan, implementation devices. Planning issues in society. Not for credit for M.S.P. degree.

446 Housing (3) Nature and demand for housing in U.S. and abroad, U.S. experience. Private market processes and public influences. Problems of change in housing supply, impact of new technology, and governmental programs to improve supply and quality of housing.

500 Thesis (1-15) P/NP only. E

502 Registration for Use of Facilities (1-15) Required for the student not otherwise registered during any semester when student uses University facilities and/or faculty time before degree is completed. May not be used toward degree requirements. May be repeated. S/NC only. E

510 Fundamentals of Planning (3) History of planning, structure and development of urban areas, operations of contemporary planning, trends and issues.

515 Theory of Planning (3) Analysis of nature and objectives of planning process; role of planner and planning function in public decision-making. Prereq: 510 or consent of instructor.

520 Planning Research Methods (3) Overall structuring of social science research in planning practice; familiarity with structure of planning literature information sources, systematic retrieval techniques, processes and tools, practice in posing research questions relevant to planning.

521 Information Systems and Networks in Planning (3) Use and impact of computer-based information systems and global networks in planning and public management. Development of practical skills in design of planning-decision support systems, databases, Internet based tools and geographic information systems (GIS). Prereq: Basic experience with computer software and hardware or consent of instructor.

525 Planning Information Systems (3) Design, analysis, and use of information systems in planning and local government. Design of planning decision-support systems; use of public data bases; impact of information revolution and new technologies on planning profession. Prereq: Consent of instructor.

530 Planning Policy Analysis (3) Basic methods of policy analysis and planning. Economic factors underlying the dynamics of change in cities and regions. Coreq: 520 or consent of instructor.

531 Land Use Analysis (3) Concept and framework for land-use analysis. Population, employment, economic-base studies and forecasting techniques.

532 Planning Methods (4) Preparation of comprehensive plans for urban areas or regions. Development of baseline data and forecasts, formulation of alternative plans and strategies, and development of plan implementation programs. Extensive laboratory experience. Prereq: 510, 520, 530 and 531 or consent of instructor.

537 Planning and Transportation (3) (Same as Civil Engineering 558.)

538 Urban and Site Design (3-6) Principles of design of residential subdivisions and some components of physical community, shopping centers, institutional complexes, central business districts. Problems of reviewing alternative designs against each other or written regulations. Extensive laboratory experience.

539 Planning for Historic Preservation (3) Planning for preservation, restoration, and conservation of historic buildings, areas and sites as related to comprehensive planning process. National, state, and local government role in preservation, designation of sites, legislative needs, financing and administrative organizations.

540 Legal Aspects of Planning (3) Legal basis for planning and guiding community development. Legal tools of planning. Prereq: 510 or consent of instructor.

543 Cultural Resources Planning (3) Cultural characteristics creating identity and spirit of place; role in environmental and land-use planning; use in protection of natural environment and cultural heritage. Cultural components of National Environmental Protection Act and case studies.

545 Planning and Property Development (2) Process of urban physical growth and change; functioning of private sector real estate development and its relationship to planning. Partnership roles of public and private sectors in urban development and redevelopment. Prereq: 510 or consent of instructor.

547 Negotiation (1) Methods, strategies, techniques and skills useful to planners in mediation, negotiation, and dispute resolution concerning urban planning and development.

548 Tourism Planning (3) Planning of tourist resources and programs within a geographic region. Tourism planning models. Relationships among tourists, tourism developments and planning of tourist attractions and services. Application of techniques in selected area.

550 Economic Development Planning (3) Planning for economic change in cities and regions. Institutional and organizational problems. Economic development planning process.

552 Development Planning in the Third World (3) Seminar on urban and regional development in Third World nations. Population growth, settlement patterns, economic development, land framework of integrated resource management. (Same as Ecology and Evolutionary Biology 552.)

553 International Planning (3) Alternative development models. Comparative analysis of planning practices and policies around world. Population growth, urbanization, environmental degradation, and economic development in developing countries.

555 Environmental Planning (3) Role of planners and planning in maintenance of balance between natural and built environment. (Same as Ecology and Evolutionary Biology 555.)

556 Futures Planning (3) Overview of world and community futures literature. Skills in trends assessment, scenario writing, and other futures planning techniques.

560 Strategic Planning & Policy Development (3) Models of strategic planning and process of policy development in applied decision making. Qualitative approaches, program evaluation and impact assessment.

590 Practicum (3) Prereq: Consent of instructor. S/NC or letter grade.

591 Special Topics (1-3) Prereq: Consent of instructor.

592 Readings in Planning (1-3) Prereq: Consent of instructor. May be repeated.

593 Problems in Planning (1-3) Prereq: Consent of instructor.

Veterinary Medicine

(College of Veterinary Medicine)

MAJOR DEGREE

Veterinary Medicine D.V.M.
Comparative and

Experimental Medicine M.S., Ph.D.

THE PROFESSIONAL PROGRAM

Admission Requirements

To qualify for admission to the professional program of the College of Veterinary Medicine, a candidate must have completed at least the minimum preveterinary course requirements listed below. These may be completed at any accredited college or university that offers courses equivalent to those at The University of Tennessee. Preveterinary course requirements must be completed by the end of spring term of the year in which the student intends to enroll. Biochemistry requirements must have been satisfactorily completed within five years of the time the applicant wishes to enter the program.

Subject Area	Semester Hours
English	6
Humanities and Social Sciences*	18
Physics	8
General Chemistry	8
Organic Chemistry	8
Biochemistry**	4
General Biology	8
Genetics	3
Cellular Biology***	3
TOTAL	66

*May include, for example, courses in English literature, speech, music, art, philosophy, religion, language, history, economics, anthropology, political science, psychology, sociology and geography.

**Exclusive of laboratory.

***It is expected that this requirement will be fulfilled by a course in cellular or molecular biology.

Admission Procedures

Admission of new students is for the fall semester, with first priority given to residents of Tennessee.

The College of Veterinary Medicine utilizes the Veterinary Medical College Application Service (VMCAS) for all applicants. Forms and instructions for making application for admission may be obtained beginning June 1, 2002 from the Office of the Associate Dean, The University of Tennessee, College of Veterinary Medicine, 2407 River Drive, Room A102, Knoxville, TN 37996-4550.

Note: The deadline for receipt of the completed application materials is November 1. NON-TENNESSEE APPLICANTS MUST

HAVE A MINIMUM CUMULATIVE GRADE-POINT AVERAGES OF 3.2 ON A 4.0 SCALE FOR APPLICATION TO BE CONSIDERED.

Applications are accepted only from U.S. citizens or permanent residents of the U.S.

D.V.M. Curriculum

The curriculum of the College of Veterinary Medicine is a nine-semester, four-year program. Each class begins in August and graduates four years later in May. The first three years generally follow the traditional fall and spring semesters with the summer break following years one and two. The final year of the professional curriculum begins immediately following semester six and is a continuous clinical rotation experience extending over 54 weeks.

Development of a strong basic science foundation is emphasized in the first year. Courses consist mostly of preclinical subjects of anatomy (gross and microscopic), physiology, immunology, bacteriology, virology and parasitology. Also included in the first year are clinical subjects of physical diagnosis and epidemiology. Considerable integration of subject matter is incorporated during this year.

The second and third years include the study of diseases, their causes, diagnosis, treatment and prevention, and courses are team-taught on an organ system basis.

The final year (three semesters) is devoted to intensive education in solving animal disease problems involving extensive clinical experience in the Veterinary Teaching Hospital. Each student will participate exclusively in clinical rotations in the Veterinary Teaching Hospital and in required externships (preferably off-campus).

Innovative features of this curriculum include: six weeks of student centered, small group, applied learning exercises in semesters one through five; three weeks of dedicated clinical experiences in the Veterinary Teaching Hospital in semesters three through five; and elective course opportunities in semesters four, five and six which allow students to focus on individual educational/career goals. Students enrolled in the D.V.M. program may register for up to 10 credit hours of graduate courses and these hours will be credited toward the D.V.M. degree. Elective study offers a unique educational alternative for students in the CVM and is intended to enhance professional growth, concentration in an area of interest and career opportunities.

In addition to education in the science and art of veterinary medicine, students receive instruction in paramedical subjects such as animal behavior, medical communication, professional ethics, jurisprudence, economics, and practice management.

The curriculum requires successful completion of 163 semester credits.

THE GRADUATE PROGRAM

The College also administers a graduate program involving all departments which leads to the Master of Science and the Doctor of Philosophy degrees. Because of the interdisciplinary departmental administration of the College of Veterinary Medicine, the faculty have opportunities in the graduate programs of other instructional units, including Animal Science (nutrition, physiol-

ogy, genetics and animal management), Microbiology (bacteriology, virology and immunology), Ecology and Evolutionary Biology (environmental toxicology), Public Health, and Comparative and Experimental Medicine. (Refer to other sections of this catalog for a full description of these programs.) The majority of the graduate students and graduate faculty of the College of Veterinary Medicine are involved in the Comparative and Experimental Medicine program. This program provides a wide spectrum of interdisciplinary training that prepares graduates for teaching and/or research careers in the health sciences.

PROFESSIONAL COURSES

801-02-03 Application Based Learning Exercise (ABLE) I, II, III (2,2,1) Small group, student-centered learning sessions with faculty facilitator for self discovery of new information. Week-long sessions based on specific clinical case or problem, and integration of basic science and clinical material. S/NC only.

804-05-06 Application Based Learning Exercise (ABLE) and Clinical Exposure I, II, III (2,2,2) Week-long small group, student-centered learning sessions with faculty facilitator for self discovery of new information; based on specific clinical case or problem; integration of basic science and clinical material. One week of clinical experience through participation in specific clinical rotations in Veterinary Teaching Hospital. S/NC only.

811 Infection and Immunity II—Bacteriology and Mycology (3) Fundamental aspects of microbiology and cell biology relative to pathogenesis of bacterial and fungal diseases of animals: antimicrobial actions and mechanisms of bacterial resistance. General approaches to diagnosis, treatment and prevention.

813 Infection and Immunity I—Immunology (2) Basic biology and practical aspects of immunology: cells of immune system, immune function and dysfunction, immunoprophylaxis, diagnostic testing and specific diseases involving immune system.

814-16 Clinical Correlations and Ethics I, II (1,2) Correlations between basic science material from concurrent courses and practice of veterinary medicine. Thoughts on wide spectrum of current veterinary ethical issues. 816—Student-led discussions follow faculty presentations.

815 Infection and Immunity III—Virology (2) Structural and genetic bases for classification of animal viruses into separate families. Molecular biology of viral replication and viral pathogenesis.

821-22 Veterinary Anatomy I, II (6,6) Integrated approach to study of developmental, macroscopic (gross), and microscopic anatomy of common domestic animals. Dissections of embalmed specimens of common domestic species for comparative purposes. Microscopy relates structure with function. Study of developmental anatomy related to normal anatomy to inherited anomalies.

823-24 Physiology I,II (4,4) Introduction to concepts and problems in physiology which form basis for clinical applications and for formal training in pharmacology, medicine, pathology, and surgery. Cellular, neural, cardiovascular, renal, respiratory, digestive, endocrine, and reproductive physiology.

827 Special Problems in Animal Science (1-8) Extramural and specially designed study for students interested in select topics in anatomy, histology, and physiology.

831 Physical Diagnosis (1) Basic care, feeding, restraint, and handling domestic animals. Introduction to physical examination and diagnostic techniques used by veterinarian.

832 Anesthesiology (2) Principles of anesthesiology: pharmacology of anesthetic agents, and introduction to anesthetic techniques in veterinary medicine.

833 Epidemiology and Evidence Based Medicine (2) Study of distribution and detriments of disease in animal populations. Use of knowledge (evidence)

gained from management of clinical patients in past to improve future clinical decision making processes.

834 Hematopoietic System (2) Pathophysiology and diagnosis of disorders involving bone marrow and blood cells, platelets, and blood coagulation in domestic animals; interpretation of laboratory test results using illustrative clinical cases.

835 Principles and Practice of Surgery (2) Principles of veterinary surgery: aseptic technique, patient and surgeon preparation, control of surgical hemorrhage and infection, and general operating room procedures. Proper methods of tissue handling, surgical instrumentation, and selection of suture materials and suturing patterns. Pathophysiology of surgical and accidental wounds: wound healing and management.

836 Toxicology (2) Principles of toxicology, molecular mechanisms, pathologic processes and clinical features of animal diseases caused by common toxic agents.

837 Food Hygiene and Zoonoses (2) Host-agent relationships, public health aspects of veterinary medicine and role of veterinarians in ecology and food hygiene.

840 Integumentary System (3) Pathophysiology, special pathology, medicine and surgery of diseases of integumentary system. Laboratory examination, pathology, diagnosis and treatment.

841 Reproductive System (4) Pathophysiology, special pathology, medicine and surgery of diseases of male and female reproductive systems and mammary glands.

842 Alimentary System (4) Pathophysiology, special pathology, medicine and surgery of diseases of alimentary systems.

843 Musculoskeletal System I (3) Pathophysiology, clinical description and basic treatment modalities of common diseases and conditions of skeletal system of small animals: development of basic diagnostic and treatment skills.

844 Musculoskeletal System II (3) Pathophysiology, special pathology, medicine and surgery of diseases of muscular and skeletal systems. Advanced principles, radiographic interpretation and surgical procedures.

845 Veterinary Nutrition (2) Principles of nutrition, and nutrition of animals in health and disease. Applied nutrition relating to individual small or large animal patient or to herd situations.

846 Multispecies Medicine (4) Anatomy, pathophysiology, medicine, and surgery of avian species, laboratory and zoo animals and reptiles. Species and diseases seen by practicing veterinarian. Current topics on foreign animal diseases.

851 Urinary System (3) Pathophysiology, special pathology, medicine and surgery of diseases of urinary system. Urinary system in health and disease.

852 Cardiovascular System (2) Pathophysiology, special pathology, medicine and surgery of diseases of cardiovascular system. Anatomic, physiologic and pharmacologic principles which provide basis for treatment.

853 Endocrine System (2) Pathophysiology, medicine and surgery of diseases of endocrine system. Mechanisms of endocrine and metabolic diseases: therapy and prevention.

854 Respiratory System (3) Pathophysiology, special pathology, medicine and surgery of diseases of respiratory system. Upper and lower respiratory systems: infectious and noninfectious diseases.

855 Radiology (3) Basic, advanced and special techniques in radiology with interpretation and use of radiologic and related techniques in diagnosis and treatment of animal diseases.

856 Special Senses (2) Pathophysiology, special pathology, medicine and surgery of diseases of visual and auditory systems.

857 Nervous System (3) Pathophysiology, special pathology, medicine and surgery of diseases of nervous system: clinical neurology and neuropathology.

858 Neurology/Ophthalmology (4) Clinical training in specialty services: ophthalmology and neurology. Direct responsibility for diagnosis, patient care, and treatment of patients in both Large Animal and Small Animal Clinical Sciences.

861 Pharmacology I (2) Principles of pharmacokinetics and pharmacodynamic properties of veterinary drugs; mode of action and pharmacologic effects including important metabolic aspects, chemical and physical properties, side effects (toxicities) and clinical application.

862 Pharmacology II (2) Continuation of 861: modes of action, pharmacologic effects, and clinical application of drugs to control specific disease conditions.

864 Infectious Diseases (2) Pathogenesis and clinical findings of major viral, bacterial, and fungal infectious diseases of domestic animals: cattle, horses, swine, sheep, goats, dogs and cats; relevant case-based presentations.

865 Clinical Rotation in Comparative Medicine (2) Clinical training in avian medicine, laboratory animal and zoo animal medicine, epidemiology, public health, and other related disciplines.

867 Special Problems in Comparative Medicine (1-8) Extramural and specially designed study for students interested in select topics in avian medicine, laboratory animal medicine, zoo animal medicine, epidemiology, public health, pharmacology or toxicology.

868 Introduction to Animal Behavior (2) Basic principles of normal and abnormal animal behavior in domestic animals; clinical case discussions to illustrate common behavioral problems and current approaches to therapy.

870 Anesthesiology (4) Clinical training in sedation and anesthesia of companion animals, food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

871 General Pathology (3) Principles of pathobiology: causes of disease, disturbances of cell growth and inflammation.

873 Infection and Immunity IV—Parasitology (3) Principles of parasitology: protozoology, helminthology, and entomology and relationship to diseases in animals.

874 Oncology (2) Fundamental aspects of cell biology and pathology relative to etiology and natural behavior of various neoplasms of animals; general approaches to diagnosis, treatment and prevention of neoplasia.

877 Special Problems in Pathology (1-8) Extramural and specially designed study for students interested in select topics in morphologic pathology, clinical pathology, clinical microbiology and parasitology.

878-79 Elective Clinical Rotation I, II (2,2) Special rotations in applied clinical education in Small Animal Clinical Sciences, Large Animal Clinical Sciences, Comparative Medicine and Pathology. Novel experience not associated with required clinical rotations may be arranged.

881 Clinical Rotations in Small Animal Clinical Sciences I (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

882 Clinical Rotations in Small Animal Clinical Sciences II (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

883 Clinical Rotations in Small Animal Clinical Sciences III (4) Clinical training in medicine, surgery and specialty disciplines for companion animals. Direct responsibility for diagnosis, care, and treatment of clinical patients.

886-89 Clinical Rotation in Radiology and Pathology I, II (4,4) Two weeks in each discipline. Clinical training in radiographic techniques and interpretation, including ultrasonography. Post-mortem examination and laboratory diagnostics: clinical pathology and introductory histopathology of biopsy specimens.

887 Special Problems in Small Animal Clinical Sciences (1-8) Extramural and specially designed

study for students interested in select topics in medicine, surgery, anesthesiology, radiology and medical specialties of small (companion) animals.

890 Transition and Accreditation Seminars (2) Discussion of USDA, state, and local animal laws and regulations: preparation of animal movement forms, veterinary ethics, jurisprudence, basic practice management, and other topics involved in practice of veterinary medicine.

891 Clinical Rotations in Large Animal Clinical Sciences I (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals

and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

892 Clinical Rotations in Large Animal Clinical Sciences II (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

893 Clinical Rotations in Large Animal Clinical Sciences III (4) Clinical training in medicine, surgery, specialty disciplines and herd health of food animals and horses. Direct responsibility for diagnosis, care and treatment of clinical patients.

897 Special Problems in Large Animal Clinical Sciences (1-8) Extramural and specially designed study for students interested in select topics in medicine, surgery, herd health, reproduction, radiology and medical specialties of large animals.

898-99 Externship I, II (2,2) Educational experiences in private practice, research facility, zoological preserve, aquarium, or other veterinary-related facility outside Veterinary Teaching Hospital; to provide experiences not frequently available in large referral veterinary teaching hospitals.

FACILITIES FOR RESEARCH AND SERVICE

Facilities for Research and Service

Bureau of Evaluation, Research, and Service

(College of Education)

Ian R. H. Rockett, *Director*

The Bureau is responsible for the coordination of research and evaluation activities and for the development of college research and service activities based in external funding. In addition, it may be called upon to provide brokering services to connect faculty expertise with needs for consultant services, technical assistance, and possible professional development activities. The Bureau directly coordinates select development of research proposals, as well as college grant and contract review, administration, and fiscal processes. The Bureau also provides the administrative home for the Appalachian Rural Systemic Initiative, Center for Literary Studies, Center on Deafness, Institute for Assessment and Evaluation, LRE for Life Project, Off-campus Program, Regional Rehabilitation Continuing Education Program, Southeastern High School Equivalency Program (Migrant Education), and Teacher Internship Program.

Center for Business and Economic Research

(College of Business Administration)

William Fox, *Director*

In its economic research endeavors, CBER today has the same basic mission determined at its inception over 60 years ago at the request of the Tennessee Legislature--to produce and disseminate new information in the field of economic research and in the specific areas of regional economic development and fiscal policy. The mission has also expanded to include influencing decision quality in the public and private

sectors and integrating departmental research through cooperative ventures in the international arena. In addition to the annual *Economic Report to the Governor* and the biennial *Tennessee Statistical Abstract*, the Center publishes research on a wide range of socioeconomic and policy issues, including taxes, banking, telecommunications, environmental concerns, and employment prospects.

While its core mission remains little changed, the scope of the CBER unit has expanded from a largely individualistic fiscal assistance program to a regional economic research, policy analysis, and communications technology arm of the College of Business Administration. CBER has a staff of three senior research faculty and a support staff in areas of research, information technology and information dissemination, and is located at 100 Glocker.

Center for Executive Education

(College of Business Administration)

John E. Riblett, *Director*

The College of Business Administration's executive/management education efforts are facilitated through the Center for Executive Education, 708 Stokely Management Center.

The Center is a major outreach activity of the University of Tennessee and a key link between the business community and the College of Business Administration. Through short-and long-term business relationships, the Center partners with companies to provide continuing education for managers, carry out research, and exchange leading edge ideas.

The non-degree programs provided to the business community include general management programs, programs for process improvement, programs in lean enterprise practices and programs in supply

chain management. They range in length from one week to four weeks.

A prominent feature of the programs is their applied nature. Through projects, assignments and workshops, participants use courses to analyze their organizations and implement immediate changes.

Much of the Center's work is customized to the needs of individual companies and provided at their sites in the U.S. or abroad.

Additional information about the Center for Executive Education can be found at <http://TheCenter.utk.edu>.

Center for Information Studies

(School of Information Sciences)

The Center for Information Studies (CIS) was established in June 1989 to be a focal point for research related to information systems and services. The Center, located at 304 Temple Court, has performed research for the federal government, state and local governments, and business and industry. Projects have ranged from strategic planning efforts to information system and service evaluations, to modeling of scientific and technical communication. Staff of the Center have been actively involved in proposal development and project performance with faculty and staff in other centers and departments at the University.

Areas of interest to the Center include information systems design, information organization and retrieval in very large databases, directories and locator tools in a networked environment, design of regional library and information system networks, new technology applications, information system support for educational reform, modeling of information processes, development of measures and methods for evaluating information system performance and effectiveness.

Center for Literacy Studies

(College of Education)

The Center for Literacy Studies was founded in 1988. The Center's purpose is to bridge theory and practice in the field of adult learning and literacy. To achieve its purpose, the Center collaborates with practitioners, policy makers, and other research organizations on projects that address five common themes: 1) building the capacity for literacy delivery systems that can meet the needs of a changing society; 2) forming partnerships with practitioners who are working to make changes in their practice of adult education; 3) developing innovative approaches to adult learning and literacy; 4) developing innovative technology applications for the field; and 5) disseminating results to the field.

Center for Physical Activity and Health

(College of Education)

The mission of the Center for Physical Activity and Health is to integrate scientific research, education, and practical applications of exercise and health science in a manner that enhances health, fitness, performance, and quality of life. The Center is a service oriented organization designed to educate the UT and Knoxville communities about the benefits of regular physical activity as well as warn about the serious potential health outcomes of leading a sedentary existence.

The Center focuses its efforts in four main areas: training future leaders in exercise promotion, providing exercise opportunities for members of the UT community, promoting exercise within the UT and Knoxville communities, and providing exercise testing and assessment.

For additional information about services, contact Dr. Dixie L. Thompson at (865) 974-1271 or via e-mail at dixielee@utk.edu.

Center for Transportation Research

(Office of Research)

Stephen H. Richards, *Executive Director*

The Center for Transportation Research, formerly the Transportation Center, was created in 1970 to foster and facilitate interdisciplinary research, public service, and outreach in the field of transportation at The University of Tennessee. It began operating full-time in 1972 and since then has contributed greatly to the overall research program of The University.

The Center, 600 Henley St., Suite 309, is a University-level organization administratively positioned within the Office of Research at UT. The Center's multidisciplinary staff

includes over 120 full-time researchers and technicians augmented with numerous faculty and students. The Center is presently organized into five major divisions: Logistics and Systems Analysis; Infrastructure and Environment; Safety and Traffic Operations; Mobility Services and Policy; and Information Technology.

The Center has three goals. The first is to conduct a program of research in transportation that is recognized for its excellence, comprehensiveness, innovation, productivity, and national leadership. The second is to develop and sustain the technical expertise for high quality transportation research by the faculty and students within the various departments and colleges of UT. The third goal is to serve the transportation research, service, and training needs of state and local government, business, and industry in Tennessee, the southeast region, and the nation.

Center of Excellence for Materials Processing

The Center for Materials Processing is one of the "Centers of Excellence" created by the State of Tennessee. It has an interdisciplinary program designed to bring together individuals with appropriate expertise to solve important materials processing problems. It emphasizes (1) the development of desirable materials properties through the control of composition, molecular structure and microstructure, (2) measurement of process variables, and (3) control of those variables to ensure proper processing. The Center conducts basic research and teaching in materials processing and carries out research to improve existing processing technologies and transfer of research results to private industry. A major aspect of the Center is student participation in industry-sponsored research programs.

The Center is located in 513 East Stadium Hall, 974-0816. For further information, contact Dr. C. J. McHargue, 974-7680.

Centers and Chairs of Excellence

The Centers of Excellence grew out of Tennessee's Better Schools Program, an initiative to upgrade state-aided education at all levels. State officials and legislators wanted to give a few outstanding academic programs in state-aided universities a special push toward prominence, well beyond regular annual increases for all programs.

In 1984, the General Assembly appropriated and the governor approved \$10 million for the first Centers of Excellence throughout the state. The public colleges and universities submitted their proposals for Centers of Excellence to the Tennessee Higher Education Commission, which made the final determinations. Now four of the University's ten Centers of Excellence are sponsored by UT or located in Knoxville.

Concurrently, the University has received state funding, which it must match dollar for

dollar, for Chairs of Excellence. These Chairs are \$1 million endowed professorships in areas of significance to the University and to the individual, foundation, or corporation providing the matching gift money. Chairholders are noted within their respective academic units. The Chairs of Excellence are:

Knoxville

Benard Blasingame Chair of Excellence in Agricultural Policy
 Chair of Excellence in Science, Technology and Medical Writing
 Clayton Homes Chair of Excellence in Finance
 College of Business Administration Chair of Excellence of Policy Studies
 Condra Chair of Excellence in Computer Integrated Engineering and Manufacturing
 Condra Chair of Excellence in Power Electronics Applications
 Goodrich Chair of Excellence in Transportation
 Hodges Chair of Excellence of English
 J. Fred Holly Chair of Excellence in Political Economy
 Nancy Gore Hunger Chair of Excellence in Environmental Studies
 UT Willis Lincoln Chair of Excellence in Physics
 Pilot Chair of Excellence in Management
 Ivan Racheff Chair of Excellence of Ornamental Horticulture
 Ivan Racheff Chair of Excellence in Materials Science and Engineering
 Forrest & Patsy Shumway Chair of Excellence in Romance Languages
 Bernadotte E. Schmitt Chair of Excellence of History

Memphis

Maury W. Bronstein Chair of Excellence in Cardiovascular Physiology
 Crippled Childrens' Hospital Foundation Chair of Excellence in Biomedical Engineering
 William and Dorothy Dunavant Chair of Excellence in Pediatrics
 Federal Express Chair of Excellence in Pediatrics
 First Tennessee Chair of Excellence in Clinical Pharmacy
 Thomas A. Gerwin Chair of Excellence in Physiology
 Goodman Chair of Excellence in Medicine
 J. R. Hyde Chair of Excellence in Rehabilitation Engineering
 Le Bonheur Chair of Excellence in Pediatrics
 E. Erick Muirhead Chair in Pathology
 Plough Foundation Chair of Excellence in Pediatrics
 Second Le Bonheur Chair of Excellence in Pediatrics
 Semmes-Murphey Chair of Excellence in Neurology
 Mark S. Soloway Chair of Excellence in Urology
 Harriet S. Van Vleet Chair of Excellence in Biochemistry
 Harriet S. Van Vleet Chair of Excellence in Microbiology and Immunology
 Harriet S. Van Vleet Chair of Excellence in Pharmacology
 Harriet S. Van Vleet Chair of Excellence in Virology

UT Medical Group Chair in Obstetrics and Gynecology

UTSI

H. H. Arnold Chair of Excellence in Computational Mechanics
Boling Chair of Excellence in Space Propulsion

The combination of the Centers of Excellence and Chairs of Excellence adds a dimension to The University of Tennessee that is not easily equaled by other institutions. UT's reputation as the premiere university in the state and as a regional and national leader in instruction, research, and public service is enhanced as a result of the infusion of these special funds.

For information concerning the individual centers sponsored by UT, contact:

Center for Laser Applications

Dr. Narendra Dahotre, Chairman
Space Institute
B. H. Goethert Pkwy
Tullahoma, TN 37388-8897
(931) 393-7474
(jlewis@utsi.edu)

Center of Excellence for Computer Applications (CECA)

Dr. Clinton Smullen, Director
UT Chattanooga
124 Grote Hall
Chattanooga, TN 37403
(423) 755-4787
(csmullen@cecasun.utc.edu)

Center of Excellence for Livestock Diseases and Human Health

Dr. Robert N. Moore, Director
UT College of Veterinary Medicine
Veterinary Teaching Hospital
Knoxville, TN 37996
(865) 974-5570
(ovrgs@utk.edu)

Center of Excellence for Materials Processing

Dr. Carl McHargue, Director
University of Tennessee
513 East Stadium Hall
Knoxville, TN 37996-2351
(865) 974-0816
(crl@utk.edu)

Center of Excellence for Neuroscience

Dr. Stephen Kitai, Director
UT Health Science Center
855 Monroe Avenue
Memphis, TN 38163
(901) 448-5957
(skitai@utmam.edu)

Center of Excellence for Pediatric Pharmacokinetics and Therapeutics

Dr. Richard A. Helms, Director
UT Health Science Center
800 Madison Avenue
Memphis, TN 38163
(901) 448-6034
(rhelms@utmam.edu)

Center of Excellence for Science and Mathematics Education

Dr. Preston Prather, Director
UT Martin

205G Gooch Hall
Martin, TN 38238
(731) 587-7163
(jprather@utm.edu)

Molecular Resource Center of Excellence

Dr. Michael E. Dockter, Director
UT Health Science Center
62 S. Dunlap, Suite 400
Memphis, TN 38196
(901) 448-7105
(mdockter@utmam.edu)

The Science Alliance

Dr. Jesse Poore, Director
University of Tennessee
101 South College
Knoxville, TN 37996
(865) 974-6765
(jpoore@utk.edu)

Waste Management Research and Education Institute

Dr. Gary Saylor, Director
University of Tennessee
676 Dabney Buehler
Knoxville, TN 37996-0845
(865) 974-8080
(saylor@utk.edu)

Child Development Laboratories

(College of Human Ecology)

Anne Miller Stott, *Director*

The Child Development Laboratories, operated by the Child and Family Studies department within the College of Human Ecology since 1927, currently offer early education programs for young children ages six weeks to five years. The Child Development Laboratories serve three purposes: to promote observation, participation, and research activities of the department and other university faculty and students; to prepare undergraduate and graduate child development professionals for working effectively with young children; and to provide a model early childhood education program for children, families and early childhood professionals.

The programs are equipped with videotaping capabilities in all classrooms, small group research rooms, and observation booths that facilitate teacher preparation and research. A variety of research projects (such as the development of creativity in young children, emergent literacy, children's political socialization, mainstreaming, and peer interactions) involves students and faculty in the college and many departments on campus. Graduate Assistants in the Laboratories participate in teaching, assessment, administrative, supervisory and research activities while working with children and families under the guidance of faculty and staff. The Child Development Laboratories are accredited by the National Academy of Early Childhood Programs, a division of the National Association for the Education of Young Children.

For more information, check Web site at <http://web.utk.edu/~utkcdl/>.

Communications Research Center

(College of Communications)

The Communications Research Center, 426 Communications Bldg., is an adjunct to the communications graduate program. Objectives of the Center are: (1) to conduct original research in mass and public communication; (2) to disseminate research-generated information; and (3) to provide research services to faculty and students, professional communicators, and others interested in improving the quality of human communications.

Energy, Environment, and Resources Center

(Office of Research)

Jack N. Barkenbus, *Executive Director*

The Energy, Environment, and Resources Center, 600 Henley Street, Suite 311, was created in 1973 to encourage interdisciplinary research directed at solutions to problems related to energy and the environment. The Center involves faculty and students in research and public service projects, manages research and development projects that involve several disciplines, and assists government and industry in specific problems related to energy, environmental, resource, and technology policy issues. The Center has a close working relationship with the Joint Institute for Energy and Environment, and Oak Ridge organizations. Sponsors include federal and state agencies, industry, and foundations.

Current research includes solid and hazardous waste management, information systems, environmental education, global environmental problems, and pollution prevention. The Center operates the Waste Management Research and Education Institute, the Center for Clean Products and Clean Technologies, the Water Resource Research Center, the Center for Geography and Environmental Education, and the System Development Institute. Current grants and contracts are approximately seven million dollars per year.

Institute of Agriculture

Jack H. Britt, *Vice President*

The Institute of Agriculture traces its history to 1869 when the University was designated as Tennessee's Federal Land-Grant Institution. Under terms of the Federal Land-Grant Act, the University was enabled to offer instruction in agriculture and the mechanic arts for the first time. Since 1869, agricultural programs at the University have

been expanded to include research for the development of new knowledge and extension for dissemination of such knowledge to citizens of Tennessee. Thus the Institute of Agriculture has come to include the work of four main divisions: Agricultural Experiment Station, Agricultural Extension Service, College of Agricultural Sciences and Natural Resources, and College of Veterinary Medicine.

AGRICULTURAL EXPERIMENT STATION

C. A. Speer, *Dean*

The Agricultural Experiment Station was established by The University's Board of Trustees on June 8, 1882, five years before the passage of the Hatch Experiment Station Act by the U.S. Congress. The University was one of the first five institutions in the U.S. to establish an Agricultural Experiment Station. Since its beginning, the Station has given first attention to investigations of concern to the agriculture of Tennessee.

The objectives of the Tennessee Agricultural Experiment Station are the creation and utilization of new knowledge through research. Fundamental research is directed toward: (a) Understanding the basic science of the processes of plant and animal production through conversion into usable products and services; (b) Understanding the resource and market forces which affect the production, transfer, processing, and utilization of agricultural commodities and the resulting impact on the economic well-being of the agricultural sector, rural areas, and the State of Tennessee; (c) Understanding the interaction of agricultural production and land uses on natural resources and the environment as they relate to long-term productivity and affect the quality of rural life; (d) Understanding the impact of food and fiber resources and the chemicals used in their production on people's well-being and the quality of life. Applied research utilizes these understandings to formulate effective production and marketing systems and to foster the development of a physical and economic environment that provides for the needs of rural, farm, and urban citizens.

The investigations of the Station follow a systematic method of gaining and applying knowledge efficiently to the biological, physical, and economic phases of producing, processing, and distributing farm and forest products; to the social and economic aspects of rural living; and to consumer health and nutrition. Both farm and urban populations gain from the accomplishments of the Agricultural Experiment Station. Examples of some of these accomplishments are new and improved varieties of crops, new and better methods of controlling crop and livestock pests, more efficient production of crops and pasture through improved fertilization and mechanization, and more efficient feeding and management of livestock.

The program is designed and administered through ten subject matter departments located at Knoxville. A majority of the faculty have teaching responsibilities in addition to their research. To assist in the research program, the Station supports over 100 graduate students. To serve Tennessee's diverse agriculture, branch stations are operated at Crossville, Grand Junction, Greeneville, Jackson, Knoxville, Lewisburg,

Martin, Milan, Oak Ridge (forestry), Springfield and Spring Hill. Professional and technical staff are in residence at these locations.

AGRICULTURAL EXTENSION SERVICE

Charles L. Norman, *Dean*

The Agricultural Extension Service was established in 1914. Its purpose is to extend through various educational means agricultural and family and consumer science information to citizens in the state.

The educational program is carried on through offices in each of the 95 counties of the state. Educational emphasis includes work in four major program areas: agriculture and natural resources, community resource development, family and consumer science, and education of young people through 4-H Clubs. County Extension staff members working directly with local people are supported in the various information fields by a specialist staff, members of which are stationed either in Knoxville, Nashville, or Jackson.

The Agricultural Extension Service operates administratively as one of four units of the Institute of Agriculture. For administration, the state is divided into four districts with supervisors located in their respective districts. District headquarters are maintained in Knoxville, Crossville, Nashville, and Jackson.

The Agricultural Extension Service operates as a three-way partnership among county, state, and federal governments. The University of Tennessee represents state and federal government and a County Agricultural Extension Committee represents county government in this partnership.

Libraries, The University of Tennessee

Barbara I. Dewey, *Dean*

Aubrey H. Mitchell, *Associate Dean*

Professors:

Baker, Gayle D., M.L.S. Alabama
 Bayne, Pauline S., M.S.L.S. North Carolina
 Britten, William A., M.S.L.S. Clarion
 Crowther, Karmen N.T., M.Ln. Emory
 Dewey, Barbara I., M.A.L.S. Minnesota
 Felder-Hoehne, Felicia H., M.S.L.S. Atlanta
 Lloyd, James B., Ph.D. Mississippi
 Miller, Tamara J., M.S.L.S. Kentucky
 Phillips, Linda L., M.L.S. Rutgers

Associate Professors:

Bridges, Anne E., M.L.S. Rhode Island
 Deeken, Jo Anne, M.S.L.S. North Texas State
 Dixon, Lana, M.S.L.S. Tennessee
 Garrett, Marie A., M.L.S. Vanderbilt
 Harris, Steven, M.L.S. Arizona
 Johnson, Kay G., M.L.S. Pittsburgh
 Kaus, Margaret, M.L.S. Indiana
 Keally, Jillian M., M.S.L.S. Tennessee
 Kim, Sook-Hyun, M.A.L.S. Indiana
 Leach, Sandra S., M.Ln. Emory
 Mack, Thura, M.S.L.S. Tennessee
 Mitchell, Aubrey H., M.S.L.S. Tennessee
 Prescod, Janette, M.S.L.S. Western Michigan

Row, Jane S., M.S.L.S. Tennessee
 Royle, Molly, M.S.L.S. North Carolina
 Smith, Rita H., M.S.L.S. Illinois
 Thomas, Deborah L., M.L.S. George Peabody
 Thomas, Steve, M.S.L.S. Tennessee
 Viera, Ann R., M.L.I.S. California, Berkeley
 Wallace, Alan, M.Ln. Washington
 Williams, Sara, M.S.L.I.S. Simmons
 Wise, Norman K., M.S.L.S. Tennessee

Assistant Professors:

Atkins, David P., M.A.L.I.S. Wisconsin
 Behrend, Linda, M.S.L.S. Tennessee
 Berry, Teresa, M.S.L.S. Tennessee
 Casado, Margaret, M.S.L.S. Tennessee
 Davis, Troy, M.L.I.S. North Carolina
 Kracker, Jacqueline, M.S. Tennessee
 Manoff, Maribeth, M.L.I.S. South Carolina
 Mellinger, Margaret, M.S. Tennessee
 Pemberton, Anne, M.S. Tennessee
 Purcell, Aaron, M.L.S. Maryland
 Ratledge, David, M.S.L.S. Tennessee
 Read, Eleanor, M.S. Tennessee
 Smith, Anthony D., M.S. Tennessee
 Starmer, Mary Ellen, M.L.I.S. Kentucky
 Williamson, Jeanine, Ph.D. North Carolina

The University of Tennessee Libraries* own approximately 2.2 million volumes and subscribe to more than 13,300 periodicals and serial titles. The Libraries' membership in the Association of Research Libraries reflects the University's emphasis on graduate instruction and research and the support of large, comprehensive collections of library materials on a permanent basis.

The UT Libraries consists of the main library (John C. Hodges Library) and four branches on the Knoxville campus (Agriculture-Veterinary Medicine Library, Map Library, Music Library, and Special Collections), and the Social Work Library in Nashville.

Research assistance is available at the reference desk in each library and online at www.lib.utk.edu/refs/askusnow/. Free self-searching of selected databases is also available in the reference area and remotely, through the World Wide Web.

Users can search the catalog of holdings at any library branch or via the UT Libraries' Web site at www.lib.utk.edu. Materials that are not available in the UT Libraries can be requested through Interlibrary Services.

The services and facilities of the University Libraries are accessible to persons with disabilities. Adaptive equipment such as a Kurzweil Personal Reader and TDD are available at the Hodges Library.

The John C. Hodges Main Library (1015 Volunteer Blvd.) is a 350,000 square-foot facility housing collections in all subject areas. The Hodges Library has over 300 graduate student carrels, 200 faculty studies, and comfortable study space for more than 2,000 people.

The Agriculture-Veterinary Medicine Library (Room A-113, Veterinary Teaching Hospital) has a strong collection in agriculture; veterinary, comparative and human medicine; and related biological sciences. Most of the publications of the U.S. Department of Agriculture and the State Agricultural Experiment Stations and Extension Services are collected.

The Map Library (Room 15, basement of the Hoskins Library, Cumberland Ave. & 15th St.) houses a collection of sheet maps, atlases, journals, and books related to cartography. Materials in print, film, and digital formats are acquired from commercial sources as well as the Government Depository program.

The Music Library (301 Music Bldg.) has a comprehensive collection of music and music literature, including books, scores, audio and video recordings, current periodicals, and microfilm. All materials in the Library of Congress "M" classification are located here.

Special Collections (2nd floor, west wing, of the Hoskins Library) is a repository of primary source materials such as rare books, manuscripts, and historical ephemera. The University Archives are also housed here. The Archives contain official records of the University; items published officially and unofficially by its units, departments, and agencies; and other materials that document University of Tennessee life. Materials from Special Collections are paged for library users from closed stacks for use in the Reading Room.

The Social Work Library (Room 292, 193-E Polk Ave., Nashville) serves College of Social Work students in field practice across the state. The library has a working collection of materials in social work and related disciplines.

The Law Library on the Knoxville campus and the libraries located on the campuses in Chattanooga, Martin, Memphis, and Tullahoma are individually administered. Each library of The University of Tennessee is accessible to all students and faculty of the University.

*Data describe the Knoxville campus, excluding the Law Library.

Maintenance and Reliability Center

(College of Engineering)

Thomas V. Byerley, *Director*

The Maintenance and Reliability Center (MRC), located at East Stadium Hall, was created in 1996 to provide an international center for research, development and application of advanced maintenance and reliability engineering. Over 25 industrial firms and a network of universities and national laboratories have joined with UT in this endeavor. The four-fold mission of the MRC consists of education, research and technology assessment, information sharing, and business support and alliances. The mission has established maintenance and reliability engineering as an interdisciplinary activity with application across a broad spectrum of industrial activities. In addition to the technology, the MRC stresses the development of management techniques that will provide industry with the means to assess the availability, costs and benefits of advanced maintenance and reliability engineering practices.

The MRC involves all departments in the College of Engineering. Interested and qualified students may affiliate as interns with the MRC program while pursuing a

degree in any of the engineering departments. Maintenance and reliability engineering courses are available. Research opportunities and graduate assistantships are also available for qualified students.

Measurement and Control Engineering Center

(College of Engineering)

Kelsey Cook, *Director*

The Measurement and Control Engineering Center, 512 East Stadium Hall, is sponsored by the College of Engineering, the Oak Ridge National Laboratory, and the National Science Foundation. The Center's program combines education, research, and technology transfer. Graduate assistantships are available for qualified students. The research is funded by major U.S. industrial companies and focuses on theoretical and practical developments in measurement and control, concentrating on areas that will significantly improve the productivity, reliability and safety of industrial systems and processes.

Center sponsored research is carried out in the fields of process control, signal and image processing, and sensor development. Research in process control concentrates in the areas of process analysis, process modeling, control system design, and real-time expert systems. Fiber optic sensor systems development is under way for monitoring and control of chemical processes.

Nutrition Institute

(College of Human Ecology)

Michael B. Zemel, *Director*
Thomas C. Namey, *Associate Director*

The Nutrition Institute is a system wide, multidisciplinary consortium of faculty who are engaged in clinical and experimental nutrition research, teaching and service. Its expertise and resources are multifaceted including tools and techniques used in cell biology, epidemiology, metabolism and clinical training.

The multidisciplinary nature of nutrition has created a situation where nutrition research and teaching is dispersed among a number of academic units, including the Department of Nutrition in the College of Human Ecology as well as in several departments in the colleges of Agricultural Sciences and Natural Resources, Arts and Sciences, Medicine, and Veterinary Medicine. The Institute provides a communication link among all efforts in nutrition sciences, coordinates collaborative research programs in nutrition and provides a unified forum for exchange and interactions with the national and international nutrition community. In addition, by creating formal ties among the units within the University that are involved in undergraduate, graduate and professional education in nutrition, teaching resources

may be pooled to strengthen nutrition-related instruction in these units.

Off-Campus Graduate Centers

KINGSPORT GRADUATE PROGRAM

UT offers at Kingsport graduate programs in engineering and Human Resource Development at the master's level.

Students who enroll in these programs must be admitted to graduate study at UT. Information and application forms may be obtained from the ETSU/UT at Kingsport, 1501 University Boulevard, Kingsport, Tennessee 37660.

CHATTANOOGA EDUCATION PROGRAM

UT offers a graduate program in education leading to the Doctor of Education degree with a major in Education, interdisciplinary concentration in leadership for teaching and learning.

Students who enroll in this program must be admitted to graduate study at UT. Information and application forms may be obtained from the UT/UTC Graduate Center, UTC, 120 Race Hall, Chattanooga, Tennessee 37403.

COLLEGE OF SOCIAL WORK

UT offers a fully accredited two-year program leading to the Master of Science in Social Work through the College of Social Work, with programs in Knoxville, Nashville, and Memphis.

The UT College of Social Work also offers a Doctor of Philosophy with a major in Social Work.

For complete information concerning the programs, see Social Work under Fields of Instruction.

Office of Information Technology

The Office of Information Technology (OIT) provides computing and telecommunications resources and services for students, faculty, and staff. Information about OIT is available on the OIT web site <http://oit.utk.edu>.

OIT provides the core information technology equipment and services for The University of Tennessee. OIT provides public-access computer labs, central computing, administrative information systems and network services, as well as information security for UT.

Individual computer accounts are provided at no charge for all UT students. These accounts may be used for e-mail, course-work, research, and personal Web pages. Information and on-line registration for computer accounts are available at <http://oit.utk.edu/helpdesk/account>. Students are also encouraged to download and use AntiVirus software supplied by OIT at no cost to the student.

Students on the Knoxville campus may access the Internet through direct Ethernet, wireless, or dial-up accounts. Students living in the on-campus Residence Halls are each provided with a switched 10Mb Ethernet connection. For off-campus students, the Enhanced Remote Access (ERA) pool is provided by 756 modems supporting 56 Kbps analog and 64Kbps/128Kbps ISDN connections. All students can take advantage of UT's new wireless infrastructure available in most of the academic and administrative buildings on campus.

To provide access to computing facilities on campus, OIT maintains seven staffed computing labs, several unstaffed labs, and supports computing installations in residence halls. The computing labs are equipped with more than 300 microcomputers including current models of Apple, Dell, and Gateway machines. In addition, there are laser printers, scanners, CD-Writers and zip drives available. A variety of industry standard software applications are available for use on the machines in the computing laboratories. Please refer to <http://oit.utk.edu/labs.html> for more information.

OIT HELP DESK

OIT provides the telephone Help Desk as a centralized source of information and service for the computer and network resources managed by OIT. Help Desk services are available to all UT students. Students may call the HelpDesk with questions in such areas as your e-mail, Internet usage and Web page design, ERA account setup and billing, desktop hardware and software, wireless and ResNet connectivity, and UNIX account. The HelpDesk phone number is 974-9900. You may also contact the HelpDesk by sending your questions via e-mail to helpdesk@utk.edu.

OIT CUSTOMER SERVICE CENTER

OIT maintains a Customer Service Center that centrally locates all contact points for walk-in support on related OIT services. Students can receive assistance and/or training on a wide variety of topics at our Customer Service Center. Just an example of some of the services offered include registering for an e-mail account, signing up for an ERA account, getting an Ethernet or wireless card installed, resetting a password, training on how to construct Web pages, and learning how to download or transfer files across the network. We will also help students learn how to download and use virus protection programs as well as help students with other applications like My Blackboard, TELNET, and WebMail. The Customer Service Center is located on the corner of Cumberland and Volunteer in rooms 103/104 Aconda Court and is open Monday through Friday, 9 a.m. until 4 p.m.

ENHANCED REMOTE ACCESS (ERA) AND SUPPORT

Any UT student, staff, or faculty member can obtain an ERA account that will give them access to the Internet, as well as UT's computing facilities, from home. OIT supports approximately 6,000 users of ERA. Currently

OIT provides up to 128K ISDN connections and 56K analog connections. The Enhanced Remote Access office is located in room 103 of Aconda Court at the corner of Volunteer and Cumberland. The ERA staff will help you set up your account as well as provide technical assistance either over the phone (via the Help Desk 974-9900) or for walk-in customers.

RESNET CONNECTIONS

OIT has wired every dorm room on campus for network access. The ResNet community enjoys a dedicated 45 Mbit DS-3 connection to the commodity internet. Each network port in the room is a 10Mb dedicated Ethernet connection. Students living in the dorms with network capable computers will be connected free of charge. Students with computers that do not have network cards installed may obtain a network card at a reduced price. Technicians are available to install and configure the network card free of charge at the Customer Service Center in Aconda Court.

TECHNOLOGY TRAINING

Several courses are offered aimed at improving skills with the technology available at UT. *Life Preserver: An Introduction to UT Computing* is offered several times each semester on supported application software and operating systems. Other courses include those about MS Office products, Dreamweaver, JavaScript, using the Internet and search engines, and Web Page Essentials, which offers four levels of HTML training. There is also a series of courses on Adobe Photoshop. Please refer to <http://web.utk.edu/~training> for more information.

COMPUTER-BASED TRAINING

Computer-Based Training (CBT) is a self-paced series of interactive, WEB delivered, learn-as-you-go courses offered on many computing topics. CBT offers courses for Microsoft products (Word, Excel, etc.), Internet topics (Internet basics, How to create a Web page, etc.), and more advanced topics, such as JavaScript, Visual Basic, object-oriented techniques, and open systems. There are over 500 courses available. This training is free to UTK students. For registration and access to the CBT courses on the WEB go to <http://oit.utk.edu/cbt/>.

STATISTICAL CONSULTING CENTER

The mission of the Center is to help people enhance the quality of their research by working together to effectively apply statistical, graphical and computing techniques. We assist UT students, faculty and staff researchers. The costs for most of our services are centrally funded for the first ten hours of assistance each semester. Beyond that the student or department would be billed. Services offered include software support, research planning, data access and management, analysis and interpretation, and presentation of results. For details, see <http://oit.utk.edu/scc/>.

OIT WEB SITE AND DOCUMENTATION

The OIT WEB page provides you with access to information about, and access to, our many OIT services. It is located at <http://oit.utk.edu/>. This information includes *The Life Preserver*, a manual to help you get started using your UNIX account and sending/receiving e-mail, quick reference guides, and frequently-asked-questions (FAQ) Web pages.

CAMPUS PHONE AND CABLE TV

OIT provides telephone services for students living on-campus in residence halls and off-campus in University resident apartments. OIT also offers on-campus students full cable TV service at an affordable price. Cable TV service shows new releases, movie classics, and much more over channels such as ESPN, MTV, BET, History, VTV-33 Movies. Please refer to <http://oit.utk.edu/services.html> for more information.

THE INNOVATIVE TECHNOLOGIES CENTER (ITC)

The ITC (<http://itc.utk.edu>) enriches the educational experience of UTK students by supporting the academic community in advancing learning through the use of instructional technologies. The ITC's services and resources are available to all UTK faculty, academic teaching staff, and graduate teaching assistants. In addition, the ITC provides Online@UT, the university's fully integrated online academic community of course materials, campus-based services and resources, and university organizations with an online presence. For more information, please refer to <http://online.utk.edu>.

Psychological Clinic

(College of Arts and Sciences)

Leonard Handler, *Director*

The Psychological Clinic supports graduate research and training in clinical psychology. Psychological assessment and psychotherapy are offered on an outpatient basis to the general public as well as to University students and staff.

Research Centers of Excellence

In 2000, the University of Tennessee created nine Research Centers of Excellence in a competitive process that sought to emphasize some of the strongest, most promising research taking place at the university. With financial support from the state of Tennessee, the nine centers have created vital research programs that promise to enhance the university's teaching and research and to contribute positively to the state economy.

The five centers in Knoxville are in environmental biology, food safety, materials science, information technology, and

structural biology. Memphis has four centers: genomics, neurology of brain diseases, diseases of connective tissue, and vascular biology. Several of the programs involve activities on the various UT campuses and collaboration with Oak Ridge National Laboratory.

CENTER FOR GENOMICS AND BIOINFORMATICS

Daniel Goldowitz, *Director*

The CGB, located in at the UT Health Science Center in Memphis, is committed to fostering an atmosphere conducive to scientific research and collaboration in the area of functional genomics, involving both basic science and clinical departments across the campuses of the University of Tennessee.

CENTER FOR INFORMATION TECHNOLOGY RESEARCH (CITR)

Jack Dongarra, *Director*

The Center for Information Technology Research (CITR) was established in the spring of 2001 to drive the growth and development of leading-edge information technology research (ITR) at the University of Tennessee. The mission of CITR is to build a thriving, well-funded community in basic and applied ITR at the University of Tennessee in order to help the university capitalize on the rich supply of research opportunities that exist in this area.

CENTER OF EXCELLENCE FOR THE NEUROBIOLOGY OF BRAIN DISEASE

Stephen Kitai, *Director*

The Center for the Neurobiology of Brain Disease works to improve the diagnosis, treatment, and prevention of neurological and psychiatric disorders. The center combines state-of-the-art technologies for brain disease research and molecular biology to improve understanding of brain function and the underlying reasons for neurological disorders ranging from Parkinson's and Huntington's diseases to schizophrenia and drug addiction.

CENTER FOR ENVIRONMENTAL BIOTECHNOLOGY

Gary Saylor, *Director*

The Center for Environmental Biotechnology (CEB) was established in 1986 to foster a multidisciplinary approach toward training the next generation of environmental scientists and solving environmental problems through biotechnology. The CEB was given Research-Center-of-Excellence status by the University of Tennessee in order to catalyze and advance a new research agenda that pushes the envelope of creative and pioneering research. This fundamental new research will revolutionize the ability to dissect, monitor and control processes at the molecular level to achieve real-time information and computational analysis in complex bioenvironmental systems.

FOOD SAFETY CENTER OF EXCELLENCE

Ann Draughon & Stephen Oliver, *Directors*

The Food Safety Center of Excellence was established in December 2000. The

center develops and evaluates strategies to destroy or control food-borne pathogens and reduce the occurrence of food-borne illnesses. Contributing to this work is a multidisciplinary team of researchers, consisting of members of UT's Institute of Agriculture's Department of Food Science and Technology as well as researchers from departments outside the institute. Specialists include scientists with expertise in biochemistry, reproductive biology, food service management, parasitology, infectious diseases and risk assessment.

VASCULAR BIOLOGY CENTER OF EXCELLENCE

Lisa K. Jennings, *Director*

The Vascular Biology Center of Excellence at the University of Tennessee Health Science Center (UTHSC) in Memphis was initiated in January 1999. The study of cellular and integrated vascular function under normal and pathologic conditions is the major research and clinical focus of the UT Vascular Biology Center of Excellence. The major collaborations formed by the participating faculty and trainees, along with the TAM (Tennessee, Arkansas, Mississippi) Cardiovascular Network of more than 70 cardiologists, creates an innovative and powerful research consortium.

CENTER OF EXCELLENCE FOR DISEASES OF CONNECTIVE TISSUE

Andrew Kang, *Director*

The Center for Diseases of Connective Tissue is located at the UT Health Science Center in Memphis. Scientists at the center conduct basic research in five areas: autoimmune diseases, such as rheumatoid arthritis and lupus; degenerative diseases, such as osteoarthritis; inflammation and the basic science of how the body reacts to injury; fibrotic diseases, such as heart failure and emphysema; and clinical research. The center also educates and trains pre- and postdoctoral fellows and conducts outreach programs.

THE TENNESSEE ADVANCED MATERIALS LABORATORY (TAML)

Ward Plummer, *Director*

The Tennessee Advanced Materials Laboratory (TAML) calls on experts in materials science and engineering, chemistry, chemical engineering, and physics at UT and the Oak Ridge National Laboratory to explore the creation of new materials through computer-intensive modeling and experimental research.

CENTER OF EXCELLENCE IN STRUCTURAL BIOLOGY

Engin Serpersu, *Director*

The mission of the UT Center of Excellence for Structural Biology (CESB) is to expand the frontiers of knowledge in biomolecular structural and functional research. The center brings together a large group of structural molecular biologists working on a wide range of biological molecules, biomolecular assemblies and complexes. Its participants represent specialties in all of the current major techniques for high-resolution structure

determination of large molecules, including X-ray crystallography, NMR spectroscopy and a battery of sophisticated biophysical tools including mass spectrometry and other spectroscopic techniques.

Research Consortiums

The University of Tennessee is a member of three not-for-profit research consortiums: Oak Ridge Associated Universities (ORAU); Southeastern Universities Research Association (SURA); and Universities Research Association, Inc. (URA).

1. Since 1946, students and faculty of UT have benefited from its membership in ORAU. ORAU is a consortium of 86 colleges and universities and a contractor for the U.S. Department of Energy (DOE) located in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal research facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship, and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOE facility that ORAU operates, undergraduates, graduates, postgraduates, as well as faculty enjoy access to a multitude of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines including business, earth sciences, epidemiology, engineering, physics, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment and program length range from one month to four years. Many of these programs are especially designed to increase the numbers of underrepresented minority students pursuing degrees in science- and engineering-related disciplines. A comprehensive listing of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the *ORISE Catalog of Education and Training Programs*, which is available at <http://www.orau.gov/orise/resgd.htm>.

ORAU's Office of Partnership Development seeks opportunities for partnerships and alliances among ORAU's members, private industry, and major federal facilities. Activities include faculty development programs, such as the Ralph E. Powe Junior Faculty Enhancement Awards, the Visiting Industrial Scholars Program, and various services to chief research officers.

For more information about ORAU and its programs, contact: Dr. Lee Magid, (865) 974-1407; Ms. Monnie E. Champion, (865) 576-3306; or visit the ORAU website at <http://www.orau.org>.

2. SURA is a nonprofit consortium of 41 universities in thirteen Southeastern states and the District of Columbia. SURA's goals are to foster excellence in scientific research, to strengthen the scientific and technical capabilities of the nation and the Southeast, and to provide outstanding training opportunities for the next generation of scientists and engineers. The SURA-Oak Ridge National Laboratory (ORNL) Summer Cooperative Research Program in Materials

Science and Engineering was established in 1989 to promote collaborations between individual university investigators and ORNL researchers. The SURA Continuous Electron Beam Accelerator Facility (CEBAF) Graduate Fellowship Program offers awards to promising graduate students enrolled or enrolling in master's or doctoral programs at SURA member institutions and whose research interests correspond to research activities to be conducted at CEBAF (i.e. nuclear and related particle physics, accelerator physics, and associated scientific and engineering fields).

3. URA, Inc. is a nonprofit corporation consisting of 86 major research-oriented universities in the United States, Canada, and Japan and is a management operating contractor for the U.S. Department of Energy (DOE) for the design, construction, and operation of the Fermi National Accelerator Laboratory (Fermilab) located near Batavia, Illinois. URA provides funds to support courses for graduate students at Fermilab. Member institutions have graduate study programs in science and are active in particle physics and astrophysics.

For more information about ORAU and its programs, SURA, and URA, Inc., contact Dr. Lee Magid, Office of Research and Information Technology and ORAU Council member at 865-974-1407; or contact Monnie E. Champion, ORAU Corporate Secretary at 865-576-3306. Additional information may also be found on World Wide Web sites at <http://www.orau.gov> and <http://cebaf.gov/sura>.

Textiles and Nonwovens Development Center

(College of Human Ecology)

Billie J. Collier, *Director*

David P. Garner, *Interim Director of Operations and Resources*

Larry C. Wadsworth, *Senior Executive for Marketing and Technology*

The Textiles and Nonwovens Development Center (TANDEC) was officially dedicated in October 1990. TANDEC was made possible through a grant from ExxonMobil Chemical Company.

Nonwovens products loom large in a number of markets and TANDEC has a strong reputation in both basic research and nonwoven product development.

Nonwovens research programs at UT include structure-property-process relationships in melt blowing polyolefins, polyesters, nylon, elastomeric polymers, engineering thermoplastics and recycled plastics; mechanism of melt blown web formation; modeling of melt blowing and spunbonding processes; development of on-line optical measurements for control of the critical properties of melt blown webs; electrical measurement of fiber alignment and bonding in nonwoven webs; thermal bonding and characterization of cotton/synthetic fiber nonwovens; computational analysis of heat transfer behavior in thermal calendaring; study of protective apparel for agricultural, industrial and medical

uses; and finishing of nonwovens. In addition to the basic research, technology transfer has been accomplished during the past several years by assisting companies in applied projects, primarily in the melt blowing area. Collaboration is ongoing with faculty in the colleges of Engineering and Arts and Sciences.

The primary missions of TANDEC are to conduct nonwoven and textile grant research programs and to develop new product applications. The TANDEC facilities further allow production of nonwovens by industrial companies. The nonwovens laboratory hosts numerous guests from industry and other institutions, and the facilities are planned to meet their needs, while safeguarding research confidentiality.

Tourism Institute

(College of Human Ecology)

Nancy Fair, *Director*

The Tourism Institute at UT uses a systems approach to enhance economic development in Tennessee and the Southeast Region. Centered in the Department of Consumer and Industry Services Management, the Institute integrates faculty expertise from the hotel and restaurant administration program, the recreation and tourism management program, and the retail and consumer sciences program to address emerging issues and needs. The Institute is also supported by the Department of Urban and Regional Planning and the College of Agricultural Sciences and Natural Resources.

Successful tourism requires attractions to draw tourists and supporting businesses that provide high quality food, lodging and related consumer goods and services. The mission is to deliver research, development, and training projects that will promote sustainable tourism in Tennessee and the Southeast Region. The Institute pursues research studies to better understand the needs of the state's and region's tourist customers to enable the industry to provide the goods and services that will increase and diversify the tourist base. It works with agencies and businesses to develop strategies for creating and expanding tourism enterprises. It also provides management level personnel to the tourism industry through the degree programs in the department and assists the industry in workforce training.

University of Tennessee Space Institute

John E. Caruthers, *Chief Operating Officer and Dean for Academic Affairs*

The Space Institute is a graduate education and research institution located on a 365 acre lakeshore campus in Middle Tennessee. UTSI was established in 1964 and has evolved into an internationally recognized institution for graduate study and

research in engineering, physics, and mathematics. The accredited academic programs and educational policies of the Space Institute have their origins in appropriate departments of The University of Tennessee. The more than 30 faculty members of the Institute carry out these accredited academic programs through classroom teaching, informal seminars, active research, and directing the research of their students in an environment of creative work and advanced study. Programs are available to students devoting full-time or part-time effort toward M.S. and Ph.D. degrees, those interested in continuing education for updating and broadening knowledge, and those who wish to pursue post-doctoral research.

Graduate degree programs are available with majors in Aerospace Engineering, Aviation Systems, Chemical Engineering, Electrical Engineering, Engineering Science, Industrial Engineering (engineering management concentration), Mathematics, Mechanical Engineering, Materials Science and Engineering, and Physics. In addition to the fundamental studies characteristic of each discipline, research opportunities are available in many areas including aerodynamics, fluid mechanics, advanced space propulsion, energy conversion processes, thermal sciences, coal combustion, magnetohydrodynamics, plasma physics, space systems, propulsion, computational fluid dynamics, and other aspects of atmospheric and space flight.

The Institute has an established Center of Excellence in Laser Applications and offers graduate studies and research opportunities in laser diagnostics, laser materials interactions, pico-second processes, and coherent and non-linear optics.

The Institute was established in part to increase the research and engineering resources of Tennessee through education and practice in relevant scientific and technical areas and in part to interface University faculty and student research with the Air Force Arnold Engineering Development Center. The faculty, research activities, and facilities of the Institute, and those available at Arnold Center through appropriate contractual arrangements, provide students an unusual opportunity for significant research in these areas. Students who enroll at UTSI are admitted to graduate study at The University of Tennessee. Graduate Research Assistantships are available for qualified students. Further information may be obtained from the Dean for Academic Affairs, The University of Tennessee Space Institute, Tullahoma, Tennessee 37388.

University Outreach and Continuing Education

Robert Leiter, *Dean*

Norvel L. Burkett, *Associate Dean and Director of Conferences*

Gayle Cooper, *Assistant Dean of Professional and Personal Development*

Robert Jackson, *Assistant Dean for Technology and Development*

M.K. Warden, *Assistant Dean for Credit Programs*

The University of Tennessee is committed to its land-grant mission of public service. The institution meets that mission by extending its continuing education services and programming resources through outreach initiatives. University Outreach and Continuing Education works with UT academic departments to offer courses, educational services and programs to students, teachers and faculty. The division offers programs using a variety of modes, helping people of all ages achieve degrees and certificates, accomplish professional development goals, and pursue recreational and intellectual interests.

Programs and courses are based upon student needs and desires, whether for self-motivated learning; for leisure and recreational programs; or for professional promotion, certification, licensure, relicensure, or mid-career changes. The Division provides these opportunities through program coordination and development of the seven departments: Department of Conferences, Department of Distance Education and Independent Study, English Language Institute, University Evening School, UT New College, Summer School and Special Programs, and UT Professional and Personal Development.

For more information, contact: University Outreach and Continuing Education, 1534 White Avenue, Knoxville, TN 37996-1526, Phone: (865) 974-3181, FAX: (865) 974-6629, E-mail: outreach@utk.edu, Website: www.outreach.utk.edu.

DEPARTMENT OF CONFERENCES

Norvel Burkett, *Associate Dean and Director*
Robert Gibbs, *Assistant Director*

UT Conferences, housed in the Conference Center Building in downtown Knoxville, offers quality meeting facilities and service in its conference center to various UT units and other organizations. In addition, the department provides management services to UT departments and faculty or outside groups that desire to hold an educational meeting anywhere in Tennessee or across the United States.

UT Conferences assists organizations in designing and managing programs to meet the needs of attendees. The staff provides professional guidance and management for small group meetings as well as for major conventions of several thousand delegates. Consulting and support services can include planning and budgeting, registration, lodging, food services, promotional materials, meeting-site management and all details to ensure a successful event. Some programs qualify for Continuing Education Units (CEUs), which become a permanent record maintained by the Division.

Professional groups and interested individuals can request interactive videoconferencing to locations worldwide. Arrangements can also be made to receive (downlink) programming or transmit (uplink) programming via satellite.

Additional information may be obtained from: UT Conferences, P.O. Box 2648, Knoxville, TN 37901, Phone: (865) 974-0250, FAX: (865) 974-0264, E-mail: conferences@utk.edu, Website: www.outreach.utk.edu/conferences.

ENGLISH LANGUAGE INSTITUTE

Jan G. Hitt, *Assistant Director*

The English Language Institute (ELI) offers a non-credit language-study program. It is designed to assist students in their pursuit of career goals or educational objectives in the United States. The courses emphasize development of communicative ability in listening, speaking, reading, and writing. Faculty members are trained in teaching English to speakers of other languages and different national backgrounds, with varying proficiency in English.

The curriculum consists of eight proficiency levels: 101-108, Introductory through Pre-Academic.

Classes meet 3-5 periods each day with emphasis on English Structure (Grammar); Listening Comprehension, Writing/Composition (Rhetoric), Conversation Practice for Communicative Purposes, Reading and Vocabulary.

Classes also assist students in pronunciation, test-taking strategies, U.S. culture orientation, and university study skills.

Additional information may be obtained from: English Language Institute, 907 Mountcastle Street, Knoxville, Tennessee 37996-3505, Phone: (865) 974-3404, FAX: (865) 974-6383, E-mail: eli@utk.edu, Website: www.outreach.utk.edu/ELI.

UT PROFESSIONAL AND PERSONAL DEVELOPMENT

Gayle Cooper, *Assistant Dean and Director*
Nissa Dahlin-Brown, *Assistant Director*

UT Professional and Personal Development provides a comprehensive array of non-credit courses, certificates, and seminars designed to serve the needs of individuals and businesses in Knoxville and surrounding communities. Courses are offered on the University campus, at off-campus locations, and on-line. They are taught by University faculty, staff, and community experts. Courses also are delivered "on-site" for business clients, with instructional services tailored to the needs of each group.

Business topics include professional development, career planning, computer training, and small business development. Personal interest topics range from business and computers to art, dance, gardening, music, and sports. There are also courses that meet requirements of the state or other agencies for certification in real estate and financial planning.

Special programming also includes Kids U, providing summer hands-on workshops for elementary and secondary education students; Seniors for Creative Learning, a membership-based program focuses on issues and courses for senior adults; and the Smoky Mountain Field School a program co-sponsored with The Great Smoky Mountains National Park.

For further information or to register, contact: UT Professional & Personal Development, 1534 White Ave., Knoxville, TN 37996-1526, Phone: (865) 974-0150, FAX: (865) 974-0154, E-mail: ProfessionalPgms@utk.edu, Website: www.outreach.utk.edu/ppd.

DEPARTMENT OF DISTANCE EDUCATION AND INDEPENDENT STUDY

Robert Jackson, *Assistant Dean and Director*

The Department of Distance Education and Independent Study, in concert with academic departments at UT, offers internet-based, web-delivered classes, and programs leading to certificates and degrees. The School of Information Sciences and the College of Engineering offer Master's degree programs through web-based courses, while the Departments of Nuclear Engineering and Statistics offer courses leading to degree and certificate programs. Other undergraduate and graduate classes and programs are in development, and a variety of individual courses in many disciplines are available. Current course availability can be found on the Web at anywhere.tennessee.edu.

The department provides services and support for faculty, students, and industry interested in flexibly-delivered education.

The Internet eLearning Institute provides certificate programs, professional development courses and training for information technology professionals or individuals wanting expertise in internet technology. Courses are offered over the world wide web in the areas of e-commerce, web databases, web mastering, network systems engineering, administrative technology, technical sales, and instructional technology.

For information and registration forms, contact the Distance Education Program at: Distance Education and Independent Study, 1534 White Avenue, Knoxville, TN. 37996-1525, Phone: (865) 974-9311 or (800) 670-8657, FAX: (865) 974-6629, E-mail: DistEducation@utk.edu, Website: anywhere.tennessee.edu.

UNIVERSITY EVENING SCHOOL

M.K. Warden, *Assistant Dean*

The University Evening School administers on- and off-campus, undergraduate and graduate courses in a variety of nontraditional formats. All courses are approved and offered in conjunction with academic colleges and departments. Support services are provided to assist working adult students in their educational pursuits.

On-Campus Evening Program

Classes are offered during late afternoon and evening hours for those students who work or have other commitments during the day. The Master of Science degree is available with majors in Computer Science, Statistics, Communications, Sport Management, Civil Engineering, Environmental Engineering, Human Resource Development, and Library Science. Also available are the Master of Public Administration and the Doctor of Education degrees.

Mini-Term

The University Evening School offers a Mini-Term during May. Students may enroll in one concentrated credit course during the Mini-Term period. Courses and instructors listed for the Mini-Term are carefully selected to reflect a broad academic base of offerings suited to an intensive program of study.

Off-Campus Programs

The Evening School conducts undergraduate and graduate courses in a number of locations away from the Knoxville campus. All course offerings and instructors are approved by the appropriate academic departments, and the credit awarded is resident credit. The M.S. with a major in Human Resource Development is available in Nashville. The M.S. with a major in Education is available in Anderson, Blount, Knox, McMinn and Sevier counties. The Ed.S. with a major in Education is available in Anderson and Hamblen counties. The Ed.D. with a major in Education is available in Chattanooga. In Oak Ridge, the Evening School offers courses leading to advanced degrees in Environmental, Industrial, and Nuclear Engineering, as well as Safety.

Workshops

Credit workshops are coordinated through various academic departments of the University and give students the opportunity to participate in short periods of intensive study. Workshops offer flexibility of timing, location and content. Summer workshops are particularly popular with teachers and school administrators. Although most workshops are held on the University's Knoxville campus, location is not a limiting factor.

Student Services

A comprehensive program of services, including academic advising and financial aid information, is provided by the University Evening School for both on- and off-campus students.

Registration: Priority registration by Web, touchtone phone, mail, FAX, or regular phone is offered as a convenience to current Evening School students. Final registration at both on- and off-campus locations is available by Web, phone or in person.

Fee Payment: The Evening School functions as a Bursar's office. Fees may be paid in person, by mail or by phone (with a credit card).

Advising: Advising is available for the benefit of all Evening School students who need assistance with academic or related matters. The program can accommodate students during regular daytime hours and in the evenings by appointment, as well as at several centralized off-campus locations. The Colleges of Arts and Sciences, Business Administration, Communications, Education and Engineering cooperate with the Evening School to provide advising appointments after work hours.

Fee Waiver Program for Senior and/or Disabled Citizens

The Evening School administers this state-legislated program for UT. Senior or totally disabled Tennessee citizens who wish to take UT credit courses may audit these free of charge or, upon admission, may pay a reduced rate to receive regular credit. Specific information about the program may be obtained in the Evening School office.

For more information, contact: University Evening School, 451 Communications Bldg., Knoxville, TN 37996-0341, Phone: (865) 974-5361 or 1-800-676-8657, FAX: (865) 974-2027, E-mail: eveningschool@utk.edu, Website: www.outreach.utk.edu/evening.

SUMMER SCHOOL AND SPECIAL PROGRAMS

M. K. Warden, *Assistant Dean*

Summer School

The Summer School offers a wide range of educational opportunities to regular students of The University of Tennessee and to visiting students. More than 1,000 different summer courses are offered by the School of Information Sciences, and departments in the Colleges of Agricultural Sciences and Natural Resources, Architecture and Design, Arts and Sciences, Business Administration, Communications, Education, Engineering, Human Ecology, Law, Nursing, and Social Work.

One full term of ten weeks and two five-week sessions are offered during the summer. The principal mission of the Summer School is to enhance the academic program for undergraduate and graduate students, attract students from other colleges to the Knoxville campus, and utilize the cultural and natural attractions of the area to further enrich students' summer experience.

The summer faculty is composed largely of regular University faculty. In addition, some well-qualified visiting faculty members may be invited to teach each session.

To obtain more information about UT Summer School, contact: Summer School, 451 Communications Bldg., Knoxville, TN 37996-0349, Phone: (865) 974-5361 or 1-800-676-8657, FAX: (865) 974-2027, E-mail: eveningschool@utk.edu, Website: www.outreach.utk.edu/evening.

Special Programs

The University of Tennessee offers a number of special programs on its Knoxville campus. Many of Special Programs' activities that may be of interest to K-12 teachers and teachers and students.

Southern Appalachian Science and Engineering Fair: The Fair brings between 400 and 500 students from East Tennessee middle and high schools where projects have been chosen to compete at the regional level. The event lasts 3-4 days, with judging occupying one afternoon and evening. Projects are displayed for public viewing after the competition until the awards convocation. Senior grand prizewinners advance to international competition.

Tennessee Governor's School for the Sciences: The annual Governor's School brings between 130 and 150 high school students from Tennessee to the campus for a four-week residential program that emphasizes skill development in writing, computer use and analytical thinking skills. The school also provides the opportunity for students to spend half of their time in a choice of seven programs with focused topics in contemporary science, engineering and mathematics.

East Tennessee Academic Decathlon: This event brings high school teams of nine students and their coach(es) to campus for a day of competitive test taking. Approximately ten teams register and pay an annual entry fee for the privilege of competing for medals and trophies.

Tennessee Science Olympiad: Having won regional competitions, approximately 270 middle and high school students and their coaches from around the state participate in this event. The day-long competition involves approximately 25 events in each of the two school levels. Some events require intellectual performance in timed competitions, while other events require that a contrivance, prepared in advance or during the competition, be made to perform to standards which are not announced until competition time.

The Academy for Teachers of Science and Mathematics: This annual event brings teachers and school administrators to the Knoxville campus. Teachers participate in a 4-week residential program, and administrators attend a 3-day workshop. Emphasis is placed on the exploration of the experiential nature of ideas in science and mathematics and the profound interdependence of these two fields of human endeavor. The goal is to teach new, exciting ways of presenting mathematics and science. In addition, the alumni are networked through the Internet and via annual meetings. Operating since 1991, the Academy presently has approximately 800 alumni in 21 states and eastern Canada.

Directory of Special Programs: Each year, the Special Programs office compiles a directory containing as many programs as can be identified on the University's Knoxville campus that may be of interest to K-12 teachers and students.

For a directory or additional information on Special Programs contact: Special Programs, 210 Hoskins Library, Knoxville, TN 37996-4012, Phone: (865) 974-3594, Website: www.acad.utk.edu/specprog.

Water Resources Research Center

(Office of Research)

Timothy R. Gangaware, *Associate Director*

The Water Resources Research Center, 600 Henley Street, Suite 311, is a federally designated institute for sponsoring and coordinating water research for the state. The purposes of the Center are: (1) to assist and support all the academic institutions of the state, public and private, in pursuing water resources research which addresses a wide range of problems of interest to the state, region, and nation; (2) to provide for information dissemination and technology transfer services to state and local government bodies, academic institutions, professional groups, environmental organizations, and others, including the general public, who have an interest in water resources matters; (3) to promote education and training in fields relating to water resources and to encourage the entry of promising students into careers in these fields. The Center maintains a technical library which includes numerous water resources-related databases on CD-ROM.