3381. Repertory and Performance III. Rehearsal and performance of master works of choreography, with emphasis on refinement of detail, clarity of phrasing, expression, musicality, and versatility within a broad range of styles. *Prerequisite:* DANC 2382 or instructor approval.

3382. Repertory and Performance IV. Rehearsal and performance of additional master works of choreography, with emphasis on refinement of detail, clarity of phrasing, expression, musicality, and versatility within a broad range of styles. *Prerequisite:* DANC 3381 or instructor approval.

4003, 4004, 4103, 4104. Pas de Deux I. Introduction to the basic elements of partnering inherent in classical ballet. Emphasis on technical skills and classical style. Includes excerpts from classical repertory. Admission by invitation. *Prerequisite:* Instructor approval.

4005, 4006, 4007, 4008, 4105, 4106, 4107, 4108. Pas de Deux II. Further exploration of the elements of partnering with an emphasis on more complex technical skills and stylistic versatility. Includes excerpts from classical repertory. Admission by invitation. *Prerequisite:* Instructor approval.

4245. Advanced Choreographic Projects. Individual directed studies in choreography with a culminating performance. *Prerequisites:* DANC 3244 and instructor approval.

4260. Pilates. A non-impact body conditioning method based on principles of abdominal and scapular stabilization. A continuation of DANC 2160, this course adds advanced mat work and Reformer exercises. Designed to give the student further understanding of the principles and muscular emphasis behind the Pilates method. Proper alignment, full range of motion, and patterned breathing will be emphasized. *Prerequisite:* DANC 4363 or instructor approval.

JOURNALISM

Tony Pederson, **Belo Distinguished Chair of Journalism**

Associate Professor: David Sedman; **Assistant Professors:** Camille Kraeplin, Craig Flournoy; **Senior Lecturer:** Susan Krasnow, Jayne Suhler; **Lecturers:** Carolyn Barta, Michele Houston; **Adjunct Professors:** Judy Babb, Tracy Brown, John Cranfill, Thomas S. Leatherbury, Quin Mathews, Jodie Steck.

The world of journalism is changing fast. Once-divergent media forms are rapidly coming together in ways that make it essential for 21st-century journalism education to reflect the complexity of actual practice. Graduates must be prepared to function and lead in a new and changing environment. The Division of Journalism prepares students to succeed in this dynamic setting.

Majors will study multimedia journalism. They may choose an emphasis either in broadcast, through traditional radio, television and online broadcast options, or an emphasis on print for publications and online text use. They will learn professional skills that will enable them to adapt swiftly to a changing journalism environment. Content that is useful and interesting will have value regardless of the delivery system or systems of a particular era. For this reason, students also are taught the intellectual and theoretical skills they will need to help them interpret the world around them and understand the role of the media in society. They will graduate as clear, concise thinkers and writers.

Instructional Facilities

The Division of Journalism is located in the Umphrey Lee Center, which houses faculty and administrative offices, audio and video production, and media support areas, including a new digital newsroom. Over time this facility will be a place where journalism students can write, edit, and produce their work across a digital network that will give them skills to work in print, broadcast, and on the Internet.

The division also has basic video/audio modules; video logging rooms; off-line editing rooms; nonlinear video editing lab; equipment storage and checkout; digital audio rooms; a teaching radio studio; seminar room; classrooms; graphics lab; editing lab; viewing rooms; and production classrooms.

Admission and Degree Requirements

Strong writing skills are essential to the student's success in the division's journalism curriculum and later in the profession of journalism. Students may enroll in journalism classes as first-year students. Those wishing permission to major in the Division of Journalism must have completed ENGL 1301 (Introduction to College Writing) and ENGL 1302 (First-Year Seminar in Rhetoric: Contemporary Issues). The student must compile a minimum G.P.A. of 3.00 (*B*) in both courses. Essay and grammar, spelling, and punctuation tests must be successfully completed before students are allowed to declare journalism as a major. Students transferring from other universities must have completed equivalent courses and obtained the equivalent G.P.A. in those courses before they can be considered a major candidate in the Division of Journalism.

Scholarships

Honors Scholarships are awarded each year to outstanding students who intend to major in journalism. Other scholarships are available to journalism students through a variety of foundations and gifts to the division.

Honors Program

The Honors Program in Journalism is highly selective. At midterm of the sophomore year, and again at midterm of the junior year, declared journalism majors with a G.P.A. of 3.50 or better can apply to the Honors Program. All interested students, including those who have been previously awarded honors scholarships, need to apply for admission to the program. At the midterm of the senior year, the top 10 percent of the graduating class is invited for membership in Kappa Tau Alpha, the Journalism Mass Communication Honorary Society. Those wishing to graduate with distinction in journalism must complete twelve hours of coursework in Honors course sections within the various communications divisions. In addition, seniors must complete an honors directed study and produce an honors thesis. For further information, contact the Honors Program director, Division of Journalism, Meadows School of the Arts, 280 Umphrey Lee, Southern Methodist University, Dallas, TX 75275.

Internships and Practica

Upon achieving junior and senior status, students are encouraged to take on experiences that enable them to work under the guidance of professionals in the news industry (internships). Many on-campus activities also offer practical experience (practica), and students are strongly urged to take advantage of the opportunities available to them through the Student Media Company, which publishes a daily newspaper, a yearbook, and a literary magazine. Practica are taken for one credit hour at a time. Internships may be taken for one, two or three credit hours at a time, depending on the number of hours worked. A total of five credit hours of internships and practica may be counted toward a student's journalism electives. Internships and practica are taken on a pass/fail basis only.

Class Attendance

Due to limited class space and enrollment pressures, a student who fails to appear on the first day of class may be administratively dropped from the class at the instructor's discretion. Furthermore, students must comply with any more specific attendance policies spelled out in course syllabi; creation and enforcement of such policies are entirely at the instructor's discretion. The division strives to keep class size small enough for individual attention, and large enough to ensure discussion and interaction among students. Very large enrollments will be limited and very small classes may be merged or canceled.

Off-campus Programs

American University. Through a cooperative program with American University in Washington, D.C., students have an opportunity to study in the nation's capital as a part of the Washington Term Program. Students may obtain credit for courses such as Reporting, Advanced Reporting, and Internship, as well as courses in other disciplines.

SMU-in-London. SMU students can earn six credit hours by enrolling in the SMU-in-London: Communications program. Conducted each year during the second session of summer school, students study in London, a hub for international communications. Courses offered carry three credit hours. They do not require prerequisites and are designed to take full advantage of London's importance as an international center. Students live in dormitories in London. As part of their international experience, students are encouraged to explore the culture and fine arts offerings of London and European countries on their own, as class schedules permit.

Program of Study

The role of the journalist in today's society has become increasingly complex and important because of a paradox: As the world shrinks amid the communication revolution, the journalist's horizons and responsibilities have vastly expanded. The rapid development of converging media technologies means journalists of the 21st century must know more about the world and also be capable of working in a variety of new media. All the while, the next generation of journalists must retain the core ethics and values of the craft. Students will study multimedia journalism, choosing one of three emphases or tracks in which to focus their studies: Broadcast, Print, or the Internet. The major requires 45 credit hours within the division. A foreign language capability of eight credit hours or its equivalent is required, and students also must satisfy Meadows School of the Arts requirements with three credit hours outside the Meadows communication divisions. Courses may be used to fulfill only one of the student's divisional requirements (i.e., a student may not fulfill two divisional requirements with one course).

Bachelor of Arts in Journalism

	Credit Hours
General Education Curriculum	41
Multimedia Journalism Core Curriculum:	24
MSA 2301 Mass Media and Society	
CCJN 3312 Newswriting and Reporting I	
CCJN 3313 Newswriting and Reporting II	
CCJN 3314 Newswriting and Reporting III	
CCJN 3320 News Editing	
CCJN 3357 Digital Photojournalism	
CCJN 4315 Ethics of Communications	
CCJN 4316 Law of Communications	
Professional Development::	9
Broadcast Emphasis (to be taken in sequence):	
CCJN 2304 Basic Video and Audio Production for News	
CCJN 4320 Broadcast Reporting	
CCJN 4384 Advanced Television News	
News Editorial Emphasis:	
CCJN 3360 Computer-Assisted and Advanced Reporting Techniques	
and (choose one of the following two courses)	

	Credit Hours
CCJN 3365 Investigative and Enterprise Reporting	
or	
CCJN 4395 Public Affairs Reporting	
and (choose one of the following two courses)	
CCJN 3382 Feature Writing	
or	
CCJN 4310 Editorial and Critical Writing	
Internet emphasis:	
CCJN 2380 Web Language and Design	
CCJN 4370 Internet Law and Ethics	
CCJN 4390 Advanced Webmastery, Cybercasting, and Cyberpublishing	
Journalism Electives:	9
All Journalism majors are required to take 9 credit hours of Journalism Electives. Students may choose any CCJN course. The following courses are particularly recommended:	
CCJN 3360 Computer-Assisted Reporting and Research	
CCJN 3385 Specialty Journalism	
CCJN 3390 Literature of Journalism	
CCJN 4330 History of Mass Communication	
CCJN 4360 Women and Minorities in the Media	
CCJN 4380 Perspectives: Objectivity and Bias in the News	
Meadows Elective/Corequirement	3
Foreign Language	8
Free Electives	26
TOTAL	120

Minor in Journalism

The minor in Journalism provides a basic understanding of the role of the news media in American society and an introduction to the basic skills necessary for the practice of the field.

Requirements: 24 term hours, distributed as follows:

MSA 2301 Mass Media and Society
CCJN 3312 Newswriting and Reporting I
CCJN 3313 Newswriting and Reporting II
CCJN 3314 Newswriting and Reporting III
CCJN 4316 Law of Communications or
CCJN 4315 Ethics of Communications
Nine additional credit hours in any CCJN 3xxx, 4xxx or 5xxx courses

The Courses (CCJN)

2301. Mass Media and Society. A survey of all print and broadcast media – their backgrounds as well as their current status as industries. Ethics, law, effects of mass media, international communication, advertising, and public relations are also treated. Required for majors.

2304. Basic Video and Audio Production for News. Practical training in the fundamentals of video and audio production techniques used in news gathering, including field production and editing.

2365. Understanding the World Wide Web. An overview and introduction to the Internet and online media, including news gathering and writing in an online environment.

2380. Web Language and Design. Students will study the convergence of traditional media as they apply to new communication technologies and produce multimedia Web sites that incorporate photography, videography, audio, and graphics. *Prerequisite:* CCJN 2365 or permission of instructor.

3312. Newswriting and Reporting I. First course in a rigorous multi-term sequence, during which students will develop the skills required for writing and reporting for various news media. *Prerequisite:* MSA 2301.

3313. Newswriting and Reporting II. See above. *Prerequisite:* CCJN 3312.

3314. Newswriting and Reporting III. See above. *Prerequisite:* CCJN 3313.

3320. News Editing. Skills and concepts required in editing for various media, including copy editing, assigning and analyzing stories, coaching and managing editorial staff, and relevant legal and ethical issues. *Prerequisite:* CCJN 3312.

3335. TV News Production. Electronic news gathering and the writing, voicing, producing and editing of television news stories. Researching of various television news story formats. Students serve as on-camera reporters, writers, narrators and producers. Technical skills of shooting, lighting, recording, editing, and post-production. *Prerequisites:* CCJN 2304, 3312, and permission of instructor.

3357. Digital Photojournalism. Training in the techniques and execution of digital photojournalism including computer processing of images. Students will learn to produce digital photojournalism and will have the opportunity to generate photographic images for the Division of Journalism convergence Web site. *Prerequisite:* Sophomore standing.

3360. Computer-Assisted Reporting and Research. Development of skills in gathering, documenting, and organizing computerized data for news gathering operations, with emphasis on mastery of professional abilities required of journalists. Techniques for locating, retrieving, appraising, and verifying information. Will include gathering information from electronic sources, including libraries, research institutions, government documents, databases, observation, interviews, the Internet, and polling. *Prerequisites:* CCJN 3313 and 3320.

3365. Investigative and Enterprise Reporting. Intensive introduction to the art of generating original news ideas about issues of public significance, developing critical news judgment, unearthing often difficult-to-access information, and organizing the information into focused, well-documented and compelling stories. *Prerequisites:* CCJN 3313 and 3320.

3382. Feature and Lifestyle Writing. Course emphasizes the conceptual and technical skills needed to develop one's own voice, bring a literary quality to one's journalism, and produce professional-level descriptive pieces and features for various media. *Prerequisite:* CCJN 3313.

3385. Specialty Journalism. Students will explore the techniques and issues associated with reporting for a range of specialty beats, including business, the arts, sports and religion. The course is meant to facilitate the special Area of Journalistic Specialty degree offered by the Division of Journalism. *Prerequisites:* CCJN 3313 and 3320.

3390. Literature of Journalism. Reading and research to acquaint the student with the literature of journalism. Special emphasis is given to the development of the journalistic style of writing in magazines and books. *Prerequisite:* Sophomore standing.

4101, 4102. Practica. One credit hour for work at on-campus media positions. Maximum of two credit hours may be earned and counted toward journalism electives. See "Internships and Practica" for more details. Offered on a Pass/Fail basis only. *Prerequisites:* Junior standing and permission of instructor and adviser.

4125, 4225, 4325. Internships in Journalism. Internship credit for off-campus work in the field during the regular term or in the summer. Students may count as electives as many as five credit hours in suitable outlets, such as television and radio stations, newspapers, magazines, etc. Offered on a Pass/Fail basis only. *Prerequisites:* Junior standing and permission of adviser.

4300. Broadcast News Seminar. Selected students are given an intensive study of an area of broadcast news that examines coverage of current events and issues.

4301. News Editorial Seminar. This seminar, offered only occasionally, usually is conducted away from campus during the summer sessions. Topic varies.

4302, 4303, 4304, 4305. Washington Term Directed Studies. Offers students an opportunity to study and practice journalism in the nation's capital.

4310. Editorial and Opinion Writing. Focuses on examining the role of opinion writing in

American journalism and teaching techniques that will help students develop clear and effective editorials and columns on a range of topics. The course emphasizes critical thinking as well as writing skills. *Prerequisites:* CCJN 3313 and 3320.

4315. Ethics of Communication. Exploration of ethical issues that are the foundation of all communication fields. Topics include free speech, privacy, government regulation, and censorship. Using a problem-solving approach, this course is designed to help students develop their own philosophical and ethical standards concerning journalism. *Prerequisite:* Sophomore standing.

4316. Law of Communication. Exploration of the historical and philosophical basis for freedom of expression. Practical applications of the law in such areas as libel, censorship, access, privacy, obscenity, copyright, and government regulations affecting broadcasting, advertising, and the press. *Prerequisite:* Sophomore standing.

4320. Broadcast Reporting. Writing, videotaping, and editing news reports for television. Includes live reporting. *Prerequisites:* CCJN 2304 and 3314.

4326. Washington Term Internship.

4331. Issues in Broadcast News. Analysis of broadcast news, techniques of investigative reporting, newsroom decision-making, political coverage, election coverage and polling, crisis coverage, and other topics. Study of the daily operation of the broadcast news profession. *Prerequisite:* Sophomore standing.

4360. Women and Minorities in the Media. Examines the impact and representation of women and minorities in the mass media from historical and critical perspectives. *Prerequisite:* Sophomore standing.

4370. Internet Law and Ethics. Explores the legal and ethical issues associated with the Internet and its continuing development and evolution. *Prerequisite:* Sophomore standing.

4375. News Management and Media Economics. Introduction to concepts and principles of news media management including strategic planning, leadership, organizational strategies, ethical and legal issues. Case studies of how media managers make decisions dealing with money, marketing, product, personnel, production and new technology. *Prerequisite:* Junior standing.

4380. Perspectives: Objectivity and Bias in the News. A study of current developments in the news as seen against the historical evolution of events. The course will emphasize the role news media play in agenda setting. Other theories of information and communications will be presented. Ideally suited for students planning careers in news, but also helpful to the news consumer. *Prerequisite:* Sophomore standing.

4384. Advanced Television News. Students serve as reporters, camera-persons, editors, producers, anchor-persons, assignment editors, and studio personnel for television newscasts, news magazine and interview programs. Technical and performance/reporting skill required. *Prerequisites:* CCJN 4320 and senior standing.

4385. Advanced Production and Design. The design and production of print, presentation, and Internet graphics. This course draws together the various aspects of editing and graphics as they apply to the production of printed and visual pieces. Emphasis will be on the production of brochures, newsletters, slides, overheads, multimedia, home pages, etc. *Prerequisite:* CCJN 3335.

4387. Arts/Media Criticism. Students obtain experience in writing reviews of movies, books, art exhibits, concerts, etc. The course often includes sessions with local critics and experts in various areas of arts and literature. *Prerequisite:* CCJN 3312 or CCPA 2308.

4390. Advanced Webmastery, Cybercasting, and Cyberpublishing. Class will create, cyberpublish, and cybercast projects on the Internet while exploring the effective use of Internet technologies and current issues. The class will maintain an interactive Web site to showcase students' work from all Meadows communication divisions, possibly expanding at some point to include other Meadows divisions. The Web site will feature student-produced radio and TV news and feature programs through streaming audio and video clips. It will also highlight written text, including articles and reviews. The Web site will be updated at least weekly, giving individual students and teams an opportunity to display their work.

4395. Public Affairs and Political Reporting. Emphasis on skills required for the reporting of news emanating from governmental bodies or politics. *Prerequisites:* CCJN 3313 and 3320.

5110, 5210, 5310. Directed Study. Independent study under the direction and supervision of a faculty member. A directed study is a close collaboration between the professor and an advanced student who conducts a rigorous project that goes beyond the experience available in course offerings. The student must secure written permission from the instructor and return a completed directed studies form to the Division of Journalism office before the start of the term during which the study is to be undertaken. *Prerequisites:* Junior standing and permission of instructor.

5301-4. Topics. This course is designed to provide a study and discussion setting for an issue or topic of current interest in the journalism profession. The courses will be offered on an irregular basis depending on the significance and timeliness of the topics that will be studied and discussed.

MUSIC

Samuel Holland, **Division Chair**

Alan Wagner, **Associate Chair**

Algur H. Meadows Professor of Violin and Chamber Music: Eduard Schmieder; **Joel Estes Tate Professor of Piano:** Joaquin Achucarro; **Artist-in-Residence of Cello:** Nathaniel Rosen; **Professors:** Jack Delaney, Kenneth Hart, Samuel Holland, David Karp, Barbara Hill Moore, Alfred Mouledous, James Ode, Larry Palmer, Paul Phillips, Simon Sargon, Thomas Tunks; **Associate Professors:** Alfred Calabrese, Virginia Dupuy, Kevin Hanlon, Michael Hawn, Carol Leone, David Mancini, Donna Mayer-Martin, Ross Powell, Carol Reynolds, Martin Sweidel, Norman Wick; **Assistant Professors:** Marciem Bazell, Betsey Brunk, Michael Dodds, Robert Frank, Burr Phillips, Alan Wagner; **Visiting Assistant Professor:** Peter Jutras; **Senior Lecturer:** Joan Heller; **Lecturer:** Julia Scott; **Visiting Lecturers:** Laura Burns, Matthew Kline; **Adjunct Professors:** Robert Guthrie, Gregory Hustis, Laurie Shulman; **Adjunct Associate Professors:** Christopher Adkins, Eric Barr, Tom Booth, Kalman Cherry, Paul Garner, Matthew Good, Douglas Howard, Barbara Hustis, John Kitzman, Jean Larson, Thomas Lederer, Ronald Neal, Wilfred Roberts, Ellen Rose, Jan Mark Sloman; **Adjunct Assistant Professors:** Deborah Baron, Kim Corbet, Susan Dederich-Pejovich, Vesselin Demirev, Erin Hannigan, Haley Hoops, Deborah Perkins, Timothy Seelig; **Adjunct Lecturers:** Alessio Bax, Carmela Casipit, Mary Cates, Donald Fabian, Kay Holt, Lynne Jackson, Drew Lang, Jon Lee, Louise Lerch, Laura McAllaster, Jamal Mohamed, Akira Sato, Ed Smith, Elizabeth Tober, James Tran; **Mustang Band Staff:** David Kehler, Tommy Tucker; **Accompanists:** Wesley Beal, Tara Emerson; **Vocal Coach/Accompanist:** Martha Gerhart.

Admission

In addition to meeting University admission criteria, entering undergraduate students intending to major in music must audition prior to matriculation. These auditions serve the purpose of determining the prospective student's previous experience and potential for success in the intended major. (Entering students intending to major in composition must submit a portfolio of original compositions and pass a performance audition.) Both the Division of Music and the University must accept the candidate in order to be classified as a music major. Information regarding auditions may be obtained by writing to the Chair of the Division of Music. The Division of Music considers transfer credits and AP test results in decisions regarding advanced placement. Departments reserve the right to give additional tests to determine the most appropriate placement in any course sequence.

Instructional Facilities

Concert performances are presented in Caruth Auditorium, a 490-seat concert hall with an acoustical construction that can be "tuned" for any type of musical presentation, the 185-seat Robert J. O'Donnell Lecture-Recital Hall, and the Dr. Bob and Jean Smith Auditorium in the Meadows Museum. The annual opera production

is presented in the 295-seat Bob Hope Theatre. The Jake and Nancy Hamon Arts Library houses an inspiring collection of almost 85,000 arts volumes and 75,000 pieces of special research material such as the Van Katwijk Music Collection.

The electronic keyboard laboratory is used for class instruction in piano, theory, and improvisation. It is equipped with Yamaha digital 88-key pianos, a MLC 100 Communications Center, computers, and a variety of sequencers, tone modules, and software applications.

Student recitals and faculty and ensemble performances are digitally recorded. All recordings are mastered as a CD and are of a quality acceptable for auditions, competitions, applications, and archival purposes.

The Meadows Center for Instructional Technology in the Arts features some of the most current instructional software in music theory, analytical research, music printing, music therapy, and music education.

The Music Therapy Clinic is a training facility that offers individual and small-group music therapy, biofeedback, stress reduction, and pain/disease management.

The Division of Music has more than 40 grand pianos, three harpsichords (two double-manuals by Schuetze and Dowd, and a single-manual by Martin), a fortepiano and nine pipe organs (an original Iberian organ built by Caetano in 1762, a four-stop continuo and an eight-stop practice organ built by Alfred Kern, a three-manual 51-stop tracker organ built by C.B. Fisk, a 22-stop Holtkamp, a three-manual tracker by Robert Sipe, and three tracker organs built by von Beckerath).

The Electronic Music Studio is a digital multitrack facility featuring the latest hardware and software on a Macintosh/ProTools-based platform. The studio is also equipped with a full range of MIDI equipment for synthesis, sampling, sequencing, signal processing, video post scoring, and recording (digital and analog).

Act of Enrollment

When a student enrolls with Meadows School of the Arts Division of Music for participation in a music course — whether as a music major, music minor, or through elective study — by the act of enrollment and in consideration of the right to participate in such course, the student (1) acknowledges his or her willingness to accept and comply with the standards and policies set forth in the *Division of Music Student Handbook*, the *Division of Music Graduate Handbook,* and all other University rules and regulations; (2) assigns to the University the exclusive right to use the proceeds from any curricular or extracurricular promotional, publicity, or entertainment activities associated with the course, including but not limited to photographs, television, recordings, motion pictures, concerts, and theatrical productions, and any right the student may have to receive any royalties and/or other sums that may be due to the student from such activities; (3) releases the University, its trustees, officers, agents, employees, and assigns from any obligation to pay any proceeds, royalties, and/or other sums that may be due to the student in connection with the course; and (4) agrees, on request of the University, to periodically execute all documents necessary to acknowledge the assignment and release set forth herein.

Specific Music Requirements

During the second year of study, each pre-music major or transfer student must apply for degree/major status. The Division of Music chair reviews applications.

All full-time music majors are required to enroll for Recital Attendance (MUAS 1010) each term for which they will receive a grade of Pass or Fail. Minors are required to enroll for four terms. To complete the requirements of the course and receive a passing grade, majors must attend a minimum of 15 (minors 10) recitals each term, in addition to those in which the student is participating for credit. A grade

of Incomplete may be awarded by the chair in case of illness or other reason based on student petition.

All sophomores shall present one solo performance in general recital each term.

Orchestral instrument majors, with the exception of guitar, are required to enroll in at least one large ensemble (i.e., wind ensemble or orchestra) each term of residence. Music majors fulfilling their ensemble requirement in a choral group are assigned by a placement hearing.

Each performance major is required to perform in recital at least one piece representing each major style period in which solo music was composed for the student's instrument (including voice). This is meant to encourage performance of contemporary works, including music written during the student's lifetime.

The Division of Music requires attendance at all scheduled class meetings, lessons, and ensemble rehearsals. The instructor determines in all instances the extent to which absences affect each student's grade. Students should become thoroughly acquainted with the class attendance policy established by their teachers and ensemble directors. Instructors are in no way obligated to make special arrangements for the student to accommodate any level of absence. All reasons for absence should be submitted in advance to the instructor. Failure to do so may result in a student's being dropped from a course with a grade of *WP* (before the calendar deadline to drop) or receiving a grade of *F* for the course.

All undergraduate music majors must receive a minimum grade of *C-* in all courses specified in the major. The major consists of all courses listed in the student's degree plan with the exception of GEC, free electives, and course work in a minor or second major. Students must retake major courses in which a grade below *C-* is received. A course may be repeated only once.

When the total number of hours required to satisfy the General Education requirements and the major requirements along with the major's supporting course requirements exceeds 122 term hours, students in such majors will be exempt from three (3) hours of Perspectives and an additional three (3) hours taken from either Perspectives or Cultural Formations.

Programs of Study
Bachelor of Music in Performance

	Credit Hours			
	Organ	**Orch**	**Voice**	**Piano**
General Education Curriculum (GEC)	35	35	35	35
MUAS 1010 (MUAS 1020 first-year fall term)	0	0	0	0
MUTH 1129, 1130, 1229, 1230, 2129, 2130, 2229, 2230, 3350	15	15	15	15
MUTH elective at the 3000 level or above	3	3		3
MUHI 1202, 3253, 3254, 3255, 3256	10	10	10	10
MUHI elective at 4000 level	3	3	3	3
PERB 1131, 1132, 2131, 2132 (or 1233, 1234)	4	4	4	4
MUPR (Performance Studies)	16	16	16	16
MUCO 3208 or 3209	2	2	2	2
PERE (Any Vocal Ensemble)			6	
PERE (Large Ensemble)	6	6		4
PERE (Chamber Ensemble)	1	3		3
PERB 3116 (Contemporary Music Workshop) (vocalists may substitute MREP 5210)	1	1	1	1
Music Electives	8	9	3	3

	Credit Hours			
	Organ	**Orch**	**Voice**	**Piano**
Electives	9	9	9	9
For Organ: MURE 3101, 4201	3			
MUHI 4320, 5207; MPED 5114	6			
MUAC 1001 (two terms)	1			
MUAC 1002 (two terms)	1			
For Orchestral: MURE 3101, 4201		3		
MPED 4305 (MPED 4303 is required for Guitar majors.)		3		
MREP 5130 or 5140 or 5150 or 5160		2		
For Voice: MURE 3001, 4101			1	
VOIC 3015, 3116, 4017, 4118			2	
PERB 2117 (two terms)			2	
PERB 2106, 2108, 2107, 2109; MPED 5216			6	
MPED 5217 or two additional terms of PERB 2117			2	
Two terms of Foreign Language			8	
For Piano: MURE 3101, 4201				3
MUAC 1001 (two terms)				1
MUAC 1002 (two terms)				1
MUAC 3000 (four terms)				2
MUPD 4125, 4126, 4396, 4397				8
MREP 4114, 4115				2
Meadows Elective/Corequirement	3	3	3	3
TOTAL	124	124	125	125

Guitar majors follow the Orchestral Instruments curriculum and are required to take only four credits of large ensemble.

Percussionists take 18-20 credits of applied study and do not have an orchestral repertoire requirement. Elective hours are reduced accordingly.

Piano majors may earn an Emphasis in Piano Pedagogy by substituting MUPD 5325 and 5326 for MUPD 4125 and 4126.

Bachelor of Music in Composition

	Credit Hours
General Education Curriculum (GEC)	35
MUAS 1010 (MUAS 1020 First-year fall term)	0
MUTH 1129, 1130, 1229, 1230, 2129, 2130, 2229, 2230, 3350	15
MUTH 3110, 4300, 4310, 5360	10
MUTH 5370	3
MUTH 1225, 1226, 2225, 2226, 3325, 3326, 4329, 4330	20
MUHI 1202, 3253, 3254, 3255, 3256	10
PERB 1131, 1132, 2131, 2132 (or 1233, 1234)	4
MUPR (Performance Studies)	4
MURE 4201	2
MUCO 3208 or 3209	2
PERE/PERB (Ensemble)	8
(Must include two terms of large ensemble and two terms of Contemporary Music Workshop [PERB 3116])	
Music Electives	3
Electives	9
Meadows Elective/Corequirement	3
TOTAL	125

Each year students must present at least one performance of an original work on a general/studio recital or in another appropriate form or medium (i.e. a film score, incidental music, dance, electronic music installation, etc.)

Attendance at regularly scheduled composition seminars is expected of all students enrolled in private composition study; failure to attend will be reflected in the grade given for composition.

Bachelor of Music in Music Therapy

	Credit Hours
General Education Curriculum (GEC)	35
Specific GEC requirements:	
Fundamentals — STAT 1301	
Science — BIOL 1303	
Perspectives — PSYC 1300	
MUAS 1010 (MUAS 1020 first-year fall term)	0
MUTH 1129, 1130, 1229, 1230, 2129, 2130, 2229, 2230	12
MUHI 1202, 3253, 3254, 3255, 3256	10
PERB 1131, 1132, 2131, 2132 (or 1233, 1234)	4
MUAS 3152, 3155, 5110	3
PERB 1203 or 2203	2
MUPR (Performance Studies)	10-12
MURE 3101 (optional)	0-1
MUCO 3208 or 3209	2
PERE (Ensemble) and/or Contemporary Music Workshop (PERB)	4
Electives	9
MUTY 1120, 1220, 3211, 3212, 3213, 3214, 3141, 3142, 3143, 3144, 4340, 4341, 4144, 4145, 4141, 4142	25
PSYC 3332, 3382, 5334, 5355	12
PSYC choose from 3380, 3383, or 5388	3
Meadows Elective/Corequirement	3
TOTAL	132

Students with a concentration in voice, percussion, or guitar must substitute two music electives for the corresponding technique class.

Students completing this program of study will also attain a minor in Psychology.

Students majoring in Music Therapy have two junior-level performance options: (1) to present a minimum of one solo performance in general recital each term of the junior year, or (2) to present a half recital of 30 minutes.

Before enrolling for internship MUTY 4144, the student must meet the following conditions:

1. Completed all course, practicum, and preclinical work.
2. Demonstrated good physical health and emotional stability.
3. Achieved functional competency on piano, guitar, percussion, and voice.
4. Achieved a cumulative G.P.A. of 2.50 and a 2.75 in all music therapy courses.

The B.M. degree in Music Therapy is approved by the American Music Therapy Association. Successful completion of this program entitles the graduate to take the national board examination in music therapy administered by the Certification Board for Music Therapists. The official designation by the board is MT-BC, the nationally accepted credential of qualified music therapists.

Bachelor of Music (Teacher Certification*)

	Credit Hours	
	Instrumental	**Vocal or Keyboard**
General Education Curriculum (GEC)	35	35
Fundamentals		
6 hours ENGL 1301, 1302		
3 hours MATH (STAT 1301 or MATH 1307, 1309, or 1337 are recommended)		
3 hours Information Technology		
6 hours Science (one course with lab) (PHYS 1320 is recommended)		
Cultural Formations		
3 hours (Diversity corequisite in CF or Perspectives)		
Perspectives		
3 hours THEA 3311 or 4373 (Fulfills Meadows Corequirement)		
3 hours HIST 2311 or 2312 (U.S.)		
6 hours from 2 Perspectives categories		
2 hours Wellness		
Supportive Courses	10	10
3 hours PSYC 2331 or EDU 2350		
7 hours free electives		
Professional Education	14	14
6 hours EDU 5335 and EDU 5368/5369		
8 hours Methods (MUED 2250, MUED 3330 general, plus either 3331 instrumental, or 3332 vocal/keyboard concentrations)		
Music (65 hours):		
MUAS 1010 (MUAS 1020 first-year fall term)	0	0
MUTH 1129, 1130, 1229, 1230, 2129, 2229, 2130, 2230, 5330	15	15
MUHI 1202, 3253, 3254, 3255, 3256	10	10
PERB 1131, 1132, 2131, 2132 (or 1233, 1234)	4	4
MUPR (Performance Studies)	14	14
MUCO 3208, 3210 (vocal), 3209/3211 (instrumental)	4	4
PERE (Large Ensemble)	5	5
PERE (Chamber Ensemble)	1	1
Keyboard concentrations may substitute one credit of MUAC 1001, 1002		
Vocal concentrations may substitute one credit of Large Ensemble		
PERB 3116 (Contemporary Music Workshop)	1	1
MUAS 2149, 3152, 3155, 5110	4	4
Instrumental: 3146, 3147, 3148, 3149, 3150, 3151, 5154 (optional for strings)	7	
Vocal or keyboard: 3146 or 3147, 3148 or 3149, 3150 or 3151, 4230		5
PERB (Diction: Choose any two from the following: 2106, 2108, 2107, 2109)		2
TOTAL	124	124

	Credit Hours	
	Instrumental	Vocal or Keyboard
*Additional requirements for Teacher Certification (6 hours Student Teaching)	6	6
Successful completion of the state TExES examination.		

The senior major has three performance options: (1) to continue the study of the instrumental or vocal concentration, with one solo performance in general recital; (2) to divide study between the concentration and a secondary instrument or voice; or (3) to engage in the private study of one or more instruments or voice other than the concentration. Prior to student teaching certification, students must submit documentation of 45 observation hours in schools.

Student teaching, in addition to being subject to the eligibility requirements published by the Center for Teacher Education, must be approved by the Music Education department, must follow successful completion of all methods (MUED) and techniques (MUAS) courses, and is considered a full-time endeavor, with no daytime course work or concurrent ensemble assignments.

Dual Degree in Performance and Music Education

Students who meet degree candidacy criteria in both performance and music education, can pursue dual degrees in these fields. If begun by the second or third semester, the second degree can usually be achieved with a range of 9-17 additional credits (approximately one semester), through wise use of electives and curricular planning. Students considering these plans should consult their adviser and the department heads as early as possible in their academic program.

The state mandated "TExES" examination is usually taken during the term of student teaching and requires concurrent attendance in preparation seminars. Students are not eligible to apply for certification until completion of degree requirements, student teaching, and successful completion of the TExES.

Bachelor of Arts in Music

	Credit Hours
General Education Curriculum (GEC)	41
MUAS 1010 (MUAS 1020 first-year fall term)	0
MUTH 1129, 1130, 1229, 1230, 2129, 2130, 2229, 2230	12
MUHI 1202, 3253, 3254, 3255, 3256	10
MUTH or MUHI elective at the 4000 level or above	3
PERB (Class Piano, according to proficiency)	0-2
MUPR* (Private Studies) or MUTH (Composition in combination with Performance Studies)	8-14
PERE (Ensemble)	4
Music electives (may include senior project)†	9-11
Electives outside of music	33
Meadows Elective/Corequirement	3
TOTAL	122

The B.A. degree is intended to serve students seeking to combine a music degree with interests in one or more of the following: a broad liberal education, the possibility of exploring the interdisciplinary relationship of music course work to

*B.A. students normally take private studies at one credit per term. Two-credit lessons or, in exceptional cases, private studies in excess of eight credits, may be taken only with prior permission from the Division Chair.

†A maximum of six credits in applied lessons, ensembles, performance fundamentals, and repertoire classes may count toward the nine credits of music electives. Other electives must be at the 3000 level or above.

course work in other areas of the Meadows School and the University as a whole, a dual degree, a minor, preparation for graduate study in music, participation in the SMU Honors Program, or a term or summer of study abroad.

Dual Degree With Computer Science

A special four and one-half year program leading to the degrees of Bachelor of Arts in Music and Bachelor of Science in Computer Science is available. Contact the Division of Music for more details.

Music Minor

The minor is designed to provide one of the following objectives:

1. A course of study in music with sufficient breadth and depth to satisfy the artistic aspiration of students from any major who have some background and experience in music, or
2. An alternative to the rigorous course of study required for the major in music for those students who do not aspire to a musical career.

Acceptance criteria for the minor include a successful audition and a theory/aural skill assessment prior to enrollment in private lessons or the theory sequence. The ability to read music is required. Aural and Written Music Theory must be taken concurrently. In any given term, the private study fee will not be waived unless the student is enrolled for at least one other course (not including MUAS 1010) required for the minor. The maximum number of credits for which the private study fee will be waived is four. Minors with a Meadows Scholarship may have other requirements and should refer to their scholarship letter. Ensemble participation is encouraged.

Requirements for the minor in music (19 term hours):

MUTH 1129 and **1229** Aural Skills and Music Theory I
MUTH 1130 and **1230** Aural Skills and Music Theory II
MUHI 1202 Introduction to Music in World Societies
MUHI Choose two courses from the following:
MUHI 3253 Medieval and Renaissance Music
MUHI 3254 17th- and 18th-Century Music
MUHI 3255 The Romantic Century
MUHI 3256 Music Since 1900
MUPR or **MUTH** Private study in instrument, voice, or composition.
Composition study, if approved, must be taken with an instrument or voice. (Four term credit hours, typically one per term)
MUTH, MUHI 3 credit hours of upper-division elective(s) in Music History, Music Theory, or Acoustics of Music (MPSY 5340)
MUAS 1010 Recital attendance for four terms (see the *Division of Music Student Handbook* for course requirements)

Music Courses Open to All University Students

The following courses are open to all students from any field of study.

Performance Classes (PERB) and Ensembles (PERE)

PERB 1203, **2203** Class Guitar
PERB 1205, **2205** Class Piano
PERB 1206, **2206** Class Voice
PERE 1112 Mustang Marching Band
PERE 1113 Meadows Chorale
PERE 1114 Meadows Concert Choir
PERE 1115 Meadows Jazz Orchestra

**Class Piano PERB 1131, 1132 is a recommended lab.

PERE 1118 Meadows Symphony Orchestra
PERE 1119 Meadows Wind Ensemble
PERE 3120 Meadows World Music Ensemble
PERE 1176 Meadows Choral Union
PERE 3150 Chapel Choir
PERE 3173 Meadows Percussion Ensemble

Music Theory, History, and Literature

MUHI 1321 Music: The Art of Listening
MUHI 2310 The Broadway Musical: Vaudeville to Phantom
MUHI 3337 Music, History, and Ideas
MUHI 3339 Music for Contemporary Audiences
MUHI 3340 Jazz: Tradition and Transformation
MUHI 3341 Women and Music, "Like a Virgin": From Hildegard to Madonna
MUHI 3342 Music, Musicians, and Audiences in 19th-Century Paris
MUHI 4350 Music in World Cultures
MUTH 4310 Introduction to Electro-Acoustic Music

Private Studies

MUPR. Specific Prefixes Indicate Instruments and Voice. A fee is required for students who are not majoring in music and for majors or minors taking lessons in excess of degree requirements.

Limited to one credit per term; permission of Division Chair is required prior to enrollment.

Music Courses

Music Pedagogy (MPED)

4184, 4284, 4384. Directed Study – Pedagogy. *Prerequisite:* Permission of instructor.

4303. Guitar Pedagogy. Prepares guitarists for studio teaching. Offered fall term of odd-numbered years.

4305. Introduction to Instrumental Pedagogy. Prepares instrumental private teachers for studio teaching. Fall term.

4308. String Pedagogy I. A survey of methods, materials, and curriculum for teaching strings at the beginning level. Focus on the philosophical, psychological, and developmental bases of string study. Review and evaluation of current educational materials. Additional topics include current trends, history of string education, and pedagogical situations. *Prerequisites*: Proficiency on a string instrument as a major, or techniques courses equivalent to MUAS 3146 Upper String and 3147 Lower Strings, or permission of the instructor. Fall term.

4309. String Pedagogy II. A continuation of the skills and concepts developed in String Pedagogy I as well as an in-depth study of methods, materials, and curriculum for teaching strings at the intermediate and advanced levels. *Prerequisite: MPED 4308.* Spring term.

5114. Organ/Harpsichord Pedagogy. A survey of teaching materials and pedagogical methods, both historical and modern, for organ and harpsichord students. Class projects include compilation of graded repertoire lists and preparation/presentation of a supervised private lesson. Spring term of odd-numbered years.

5216. Vocal Pedagogy I. A study of vocal techniques. Information useful to the singer, studio voice teacher, and choral director. Vocal acoustics, breathing, and laryngeal function are studied. Fall term. *Prerequisite:* Permission of instructor.

5217. Vocal Pedagogy II. Teaching strategies and philosophies, diagnosis of vocal problems, stage deportment, vocal repertoire, and ethics for teachers are studied. Students gain practical, supervised experience in teaching. Spring term. *Prerequisite:* MPED 5216.

Music Psychology (MPSY)

5102. Management of Performance Stress. Experiential study of learning to deal with stage fright. Offered irregularly.

5340. Acoustics of Music. Study of acoustical foundations of music. Topics covered include

basic acoustics, acoustics of musical instruments and voice, room and auditorium acoustics, acoustical principles of sound systems, and psychoacoustics. Spring term.

Music Repertoire (MREP)

4114, 4115. Piano Repertoire. A broad survey of piano literature, including lectures and performances by the students enrolled. Performance styles and practices of every historical period are emphasized. Fall and spring terms.

5030, 5130. Guitar Repertoire. Student performances of their solo repertoire and individual instruction in a master-class setting.

5040, 5140. Orchestral Repertoire – Woodwinds.

5050, 5150. Orchestral Repertoire – Brass.

5060, 5160. Orchestral Repertoire – Strings.

5209. Classical and Romantic Song Literature. An overview of song literature from the Classical and Romantic periods. Students will prepare repertoire for performance in class and make presentations on topics of specialized interest. Lectures will focus on specific developmental trends such as the genesis of the song cycle, the evolution of the piano accompaniment in the 19th century, and links between poets and composers.

5210. Twentieth-Century Song Literature. A survey of repertoire and performance practices of song literature from the 20th century. The course is designed to provide a general knowledge of the literature, to acquaint students with performance notational practices, and to develop the musical skills necessary to perform this literature.

Accompanying (MUAC)

1001. Techniques of Vocal Accompanying. A course designed for pianists to acquaint them with the various skills associated with accompanying and to familiarize them with some of the vocal repertoire. Students earn one-half credit each term. Fall term.

1002. Techniques of Instrumental Accompanying. A course designed for pianists to acquaint them with the various skills associated with accompanying and to familiarize them with some of the instrumental repertoire. Students earn one-half credit each term. Spring term.

3000. Practicum in Collaborative Performance. Practical application of accompanying skills through studio assignments and performance. Students earn one-half credit each term. *Prerequisite:* MUAC 1001 (two terms) and 1002 (two terms).

Music Arts and Skills (MUAS)

1010. Recital Attendance. Required of all music majors each term in residence (minimum seven terms). First-year students attend MUAS 1020. Fall term.

1020. Career Orientation. Required orientation for all first-year music majors. Provides valuable information about college life and professional opportunities in music. Fall term.

1202. Musical Theatre Workshop. Aspiring singers and actors develop their artistic talents in the craft of musical theatre in this comprehensive two-week program. Students study acting, movement, and voice and participate in individual singing and coaching lessons with experts. Solos, scenes, and ensemble work are presented at a final class performance open to the public.

2149. Introduction and Survey of Music Programs. A broad-based survey of the makeup and aims of music programs of all levels, including directions the beginning college student should pursue in preparing for a career. Fall term.

3146. Upper String Techniques. Basic principles involved in playing and teaching violin and viola. Fall term.

3147. Lower String Techniques. Basic principles involved in playing and teaching cello and bass. Spring term.

3148. Single-Reed and Flute Techniques. Basic principles involved in playing and teaching single-reeds and flute. Fall term.

3149. Double-Reed Techniques. Basic principles involved in playing and teaching double-reed instruments. Spring term.

3150. Low-Brass Techniques. Basic principles involved in playing and teaching low brass. Fall term.

3151. High-Brass Techniques. Basic principles involved in playing and teaching upper brass. Spring term.

3152. Percussion Techniques. Basic principles involved in playing and teaching percussion. Fall term.

3155. Vocal Techniques. Basic principles involved in singing and teaching voice. Spring term.

4230. General Music Practicum. Focus of this course is on crafting and teaching mini-lessons for peers in the college classroom as well as in area public school classrooms. Video camera is used extensively for accurate feedback. Fall term. *Prerequisite:* MUED 3330.

5110. Computers, Keyboards, and MIDI for Musicians. Introductory concepts and functional skills in contemporary electronic music technology. Operation of tone generators — samplers, synthesizers. Digital sequencing and music notation software. Basic applications in composition, performance, and pedagogy. Fall term.

5145. Piano Technology for Pianists. Basic skills to enable a pianist to solve problems and tune his or her own piano. Spring term.

5154. Marching Band and Jazz Techniques. For music education majors, this course develops techniques for designing and teaching marching band shows, and methods and materials for teaching jazz. Resources will include state-of-the-art software and audio and video materials. The development of fundamental skills and improvisation on the jazz rhythm instruments will be required. Offered Fall term of even-numbered years.

Conducting (MUCO)

3208. Fundamentals of Choral Conducting. All basic beat patterns, subdivision, fermata problems, beat character. Introduction to left-hand usage, basic score reading. Emphasis on the psychophysical relationship between conductor and ensemble. Fall term.

3209. Fundamentals of Instrumental Conducting. Focus includes basic conducting technique, score reading, score analysis, and general rehearsal procedures. Attention is given to rehearsal techniques in a laboratory setting. Fall term.

3210, 5210. Choral Conducting Practicum. Stresses development of rehearsal techniques in a laboratory setting. Choose, prepare, and rehearse music with other students in class to develop skills in error detection, rehearsal pacing, sequencing, and ordering of music for optimum rehearsals. Spring term. *Prerequisite:* MUCO 3208 or equivalent.

3211. Instrumental Conducting Practicum. Stresses development of rehearsal techniques in a laboratory setting. Prepare and rehearse music in sectional and full ensemble settings to develop skills in error detection, rehearsal pacing, sequencing, and ordering of music for optimal rehearsals. Concurrent enrollment with MUED 3331. Spring term. *Prerequisite:* MUCO 3209 or equivalent.

4184, 4284, 4384. Directed Studies in Conducting.

5309. Advanced Instrumental Conducting. Stylistic analysis of a range of large ensemble repertoire, with emphasis on historical context, performance practice, interpretive issues, performance techniques, and conducting problems. Study of baton and rehearsal technique. Spring term.

Music Education (MUED)

2250. New Horizons In Music Education. Observation and discussion of teaching methodologies conducted primarily in the public schools. Includes "hands-on" teaching experiences with supervision by SMU faculty and public school cooperating teachers. Spring term.

3330. General Music Methods and Materials. An investigation of major approaches for teaching elementary general music. Includes public school classroom observations. Fall term.

3331. Band and Orchestra Music Education Methods, Literature, and Materials. Covers materials for instruction, motivation, administration, class control, and performance preparation. Concurrent enrollment with MUCO 3211. Spring term.

3332. Choral Music Methods and Materials. Focus on the art and practice of developing successful choral programs for grades 5-12. Topics include recruitment, auditions, behavior management, vocal techniques, the changing voice, choosing music, planning rehearsals, and management of nonmusical details. Includes public school observations. Spring term.

4194, 4294, 4394. Directed Studies in Music Education.

5115. Music Education Methods and Materials in the Church. The principles and practices of music education useful to church music professionals and others who may be interested in church work. Spring term of odd-numbered years.

5149, 5150, 5151, 5152, 5153, 5154. Workshop in Music Education. Offered irregularly.

5159. Instrument Repair. The study of techniques used in the repair of orchestral instruments. Offered irregularly.

5252. Wind Literature for the Secondary School. Survey of new and standard literature suitable for secondary school students. Music for instrumental solo, ensemble, band, and orchestra will be examined. Fall term.

5253. Vocal and Choral Literature for the Secondary School. Survey of new and standard vocal solo, ensemble, and choral literature suitable for the secondary school. Fall term.

5257. Computer Applications in Music Education. The investigation of the potential for computer use in music education, including computer-assisted instruction, information storage and retrieval, book and record keeping, and specialized uses such as computer-assisted management of schools of music; and the development of basic techniques for designing and implementing such uses. Offered irregularly.

5353. Music in Early Childhood Education. A study of the role of music in teaching young children, including planning music experiences for preschool and early elementary levels. Offered irregularly.

Music History (MUHI)

1202. Introduction to Music in World Societies. Offers an introduction to basic elements of music within the context of cultural traditions of world music. Students will study musical traditions of Western art music, jazz, African American gospel music, and music of India, China, Africa, and Latin America. Musical forms, techniques, terminology, and chronology are presented, but primary emphasis is placed upon listening to and experiencing a diverse sample of music and its roles in societies. Spring term.

1321. Music: The Art of Listening. An investigation of the elements of music (melody, rhythm, harmony, form, timbre) as they develop and change throughout the various historical periods of music. Emphasis is on active listening. For nonmajors. Does not satisfy music history requirements for music majors.

2310. The Broadway Musical: Vaudeville to Phantom. The explosion of American musical theater beginning in the 1890s, tracing the stars, the shows, and their creators from vaudeville through Broadway and up to the works of Stephen Sondheim and Andrew Lloyd Webber.

3150. Russian for Musicians. Students will learn the Cyrillic alphabet and transliteration while building a vocabulary of Russian musical terms. Course materials are drawn from authentic Russian-language scores, recordings, and books. Spring term.

3253. Survey of Medieval and Renaissance Music. A survey of the origins and evolution of musical forms, compositional procedures, performing practices, theoretical treatises, and instruments of Western music from the rise of the Christian Church through the 16th century. This course includes a required listening lab. Fall term. *Prerequisite:* MUHI 1202.

3254. Seventeenth- and 18th-Century Music. A survey of the Baroque, Pre-Classic, and Classic stylistic periods of Western music. Emphasis will be directed toward musical forms, compositional procedures, performance practices. This course includes a required listening lab. Spring term. *Prerequisite:* MUHI 1202.

3255. The Romantic Century. An examination of the literature of the 19th century with regard to the evolution of formal, compositional, and stylistic procedures. This course includes a required listening lab. Fall term. *Prerequisite:* MUHI 1202.

3256. Music Since 1900. An examination of representative literature reflecting the various stylistic trends and movements that have occurred in the 20th century. This course includes a required listening lab. Spring term. *Prerequisite:* MUHI 1202.

3337. Music, History, and Ideas. A broadly based study of the basic elements, ideas, and

cultural patterns of the Western world as they apply to music from the Middle Ages to our own times. Offered irregularly.

3339. Music for Contemporary Audiences. An examination of the interaction of the various forms of popular musical expression (folk, blues, soul, rock, Muzak, and film music) and their impact upon American culture.

3340. Jazz: Tradition and Transformation. Bunk, Bird, Bix, Bags, and Trane. From blues to bop, street beat to free jazz. A study of the people and music from its African/Euro-American origins through the various art and popular forms of the 20th century.

3341. Women and Music, "Like a Virgin:" From Hildegard to Madonna. An introduction to the rich traditions of musical women and to the variety of roles women have played in both "art" music and popular music. Also introduces feminist and gender theories as related to the music of women and men.

3342. Music, Musicians, and Audiences in 19th-Century Paris. See MUHI 4342 for description. Non-music majors use this course number for enrollment.

4192, 4292, 4392. Directed Studies in Music History. Must be approved by department head.

4301. Research Project in Music History.

4316. Chamber Music of the 18th and 19th Centuries. An examination of chamber music literature from Haydn to Debussy and Ravel by means of analysis, recorded performances, open rehearsals, and live concerts. *Prerequisite:* Completion of Music History sequence or written permission of department head.

4320. Organ History and Literature. A survey of the literature for the organ, Renaissance to contemporary. Required of organ majors and concentrations (undergraduate). Spring term.

4334. Survey of Vocal Literature. Covers Western secular art song. Representative literature from the Renaissance, Baroque, Classic, and Romantic periods and the 20th century in terms of stylistic characteristics, text-music relationships, and performance practices. *Prerequisite:* Completion of Music History sequence or written permission of department head.

4341. Women Composers and Performers in the 19th and 20th Centuries. Examines women musicians from the early 19th century to the present. Included are considerations of women's professional and private music education. Women's contributions in a wide variety of professional areas (performance, composition, education, scholarship) are examined within the changing social contexts of the two centuries. Class activities include a variety of types of readings (memoirs, journals, newspaper reviews), videos, recordings, scores and analyses, and live student performances. *Prerequisite:* At least two MUHI survey courses.

4342. Music, Musicians, and Audiences in 19th-Century Paris. Explores music and musicians living and performing in Paris, the city considered to be Europe's glittering capital of the arts during the 19th century. Discussions of the political and social roles of music following the Revolution (such as the establishment of the Paris Conservatory and the National Opera) will provide the foundation for a focus on the Parisian musical scene during the years 1830-1870. Class trips to events at 19th-century concert halls (Palais Garnier, Théatre Chatelet), modern halls performing 19th-century repertoire, churches (Madeleine, St. Sulpice), and café-cabarets. Fall term of odd-numbered years. (SMU-in-Paris.)

4345. Survey of Opera Literature. A chronological survey of opera, beginning with a brief introduction to Medieval and Renaissance precedents, followed by an in-depth presentation of selected Baroque and Classical masterworks. The study of 19th-century opera will emphasize the many ways in which Romantic opera synthesized music, literature, and art, as well as elements of politics and culture. The musical language and dramatic substance of selected works from 20th-century operatic repertoire will be investigated. Students will be expected to spend a significant amount of time viewing operas on video and laser disc, and in certain cases making comparative studies of productions. *Prerequisite:* Completion of Music History sequence or written permission of department head.

4346. Survey of Piano Literature. Historical and stylistic study of the music for the piano. *Prerequisite:* Completion of Music History sequence or written permission of department head.

4347. Symphonic Literature. An examination of representative orchestral works from the late

Baroque to the present day. Attention will be directed to the forms, compositional procedures, and orchestration devices employed by selected composers who reflect the various stylistic orientations within this time frame. *Prerequisite:* Completion of Music History sequence or written permission of department head.

4348. Guitar History and Literature. Examines the history of guitar and its music from the early 16th century to the present. Included are the vihuela and Baroque guitar, four-string Spanish guitar, and related literature. Emphasis is given to the evolution of the modern instrument and its repertoire. Offered spring term of odd-numbered years. *Prerequisite:* Completion of Music History sequence or written permission of department head.

4350. Music in World Cultures. Musical activities and principles selected from various geographical areas of the world. Emphasis is on non-Western materials, but will also study significant cross-cultural encounters. Offered irregularly.

4373. History of Musical Instruments. Study of musical instruments from the early Christian times to the 20th century. Attention is given to performance practices, treatises concerning construction and pedagogy, and the influences of the various instrumental families upon compositional procedures and forms. Offered irregularly.

4375. History of American Music. American music from colonial times to the present. Course includes an examination of compositional forms, procedures, and techniques of selected composers. *Prerequisite:* At least two MUHI survey courses.

4376. Music in Weimar. Students will explore the critical developments in German music from the late Baroque through the Second World War as reflected in the rich cultural life of Weimar. Excursions to Berlin, Leipzig, Dresden, and Eisenach will allow additional focus on German opera and the development of German instrumental music and orchestral institutions. *Prerequisite*: Completion of Music History Sequence or written permission of department head.

4384. Survey of Choral Literature. A survey of choral music from the medieval era to the present. Examination of representative compositions will be made with regard to genre, form, compositional procedures, and stylistic aspects. Discussion of the works will also include the social-political conditions, intellectual-artistic states of mind of patrons and composers, and other external influences. Offered Spring term of even-numbered years. *Prerequisite:* Completion of Music History sequence or permission of department head.

5206. Performance Practices in Early Music. Studies in the interpretation of Baroque music from a stylistic point of view. Offered Spring term of even-numbered years.

5207. Organ Survey. Organ building — fundamentals of construction and design; organ history as it relates to the development of a style-conscious concept of enrollment. Required of organ majors and concentrations (undergraduate). Recommended elective for M.M. and M.S.M. degree. Fall term.

Piano Pedagogy (MUPD)

4125, 4126. Piano Pedagogy Practicum. Supervised teaching experience; specific goals and projects are agreed upon for the term. Required for all piano majors.

4396. Piano Pedagogy I. In-depth study of methods and curriculum for teaching piano at the elementary level. Focus on philosophical and physiological bases of piano study. Survey and evaluation of current educational materials. Offered fall term of even-numbered years.

4397. Piano Pedagogy II. In-depth study of methods, materials, and curriculum for teaching piano at the intermediate and advanced levels. Additional topics: current trends (including technology), professionalism, history of piano pedagogy, employment opportunities. Offered fall term of odd-numbered years.

5103, 5203. Creative Piano Teaching. Pedagogical projects designed to meet the needs of the piano teacher. Offered in conjunction with the National Piano Teachers Institute each July. Majors are limited to one credit.

5210. Class Piano Procedures. The psychological principles operative in group and class environments are explored through student participation and observation, with emphasis on teacher effectiveness. Survey of college-level keyboard texts. Offered spring term of even-numbered years.

5312. Survey of Precollege Piano Literature. Survey and performance of standard piano

literature in all style periods for precollege students. Emphasis on technical preparation and curriculum-building. Offered spring term of odd-numbered years.

5325, 5326. Piano Pedagogy Internship I and II. Supervised teaching experience; specific goals and projects are agreed upon for the term. Required of all undergraduate piano majors with an emphasis in piano pedagogy performance.

Private Studies (MUPR)

The following numbers for private study apply to all instruments and voice.

3100. One-Credit Courses. One half-hour lesson each week (14 per term) with a jury examination at the conclusion of each term. These repeatable course numbers are offered each fall, spring, and summer.

3200. Two-Credit Courses. One-hour lesson each week (14 per term) with a jury examination at the conclusion of each term. These repeatable course numbers are offered each fall and spring. Majors are required to enroll in private studies each term until degree requirements are completed.

The following subject prefixes will be used to designate study in the specific instrument or in voice. Section numbers which indicate the specific teacher with whom the student should enroll are listed in the Schedule of Classes for each term.

BSSN	Bassoon	HARP	Harp	TROM	Trombone
CELL	Cello	HARS	Harpsichord	TRPT	Trumpet
CLAR	Clarinet	OBOE	Oboe	TUBA	Tuba
DBBS	Double Bass	ORG	Organ	VLA	Viola
FLUT	Flute	PERC	Percussion	VIOL	Violin
FRHN	French Horn	PIAN	Piano	VOIC	Voice
GUIT	Guitar	SAX	Saxophone		

Vocal coaching (for voice majors only) course numbers are: VOIC 3015, 3116, 4017, 4118. The instructor coaches the singer on diction and interpretation of art song and aria.

Recitals (MURE)

3001. Junior Recital for Voice Majors. Solo performance of approximately 30 minutes of music. Graded Pass/Fail by committee.

3101. Junior Recital. Solo performance of approximately 30 minutes of music. Graded Pass/Fail by committee.

4101. Senior Recital for Voice Majors. Solo performance of approximately one hour of music. Graded Pass/Fail by committee.

4201. Senior Recital. Solo performance of approximately one hour of music. Graded Pass/Fail by committee.

Composition and Theory (MUTH)

1129, 1130. Aural Skills I and II. Beginning studies in solfeggio, melodic, and harmonic dictation. Must be taken in sequence. Fall and spring terms. *Corequisites:* MUTH 1229, 1230.

1225, 1226. Composition. Individual study with the composition faculty and regularly scheduled seminars with faculty and visiting guests. Fall and spring terms. *Prerequisite:* First-year majors or permission of instructor.

1229, 1230. Theory I and II. Rudiments (notation, clefs, key signatures, intervals, scales, modes), diatonic and chromatic harmony, figured bass, part-writing, analysis. Must be taken in sequence. Fall and spring terms. *Corequisites:* MUTH 1129, 1130.

2129, 2130. Aural Skills III and IV. Continuation of Aural Skills I and II. Solfeggio, melodic, and harmonic dictation employing chromaticism, 20th-century materials. Must be taken in sequence. Fall and spring terms. *Prerequisites:* MUTH 1130, 1230. *Corequisites:* MUTH 2229, 2230.

2225, 2226. Composition. Individual study with the composition faculty and regularly scheduled seminars with faculty and visiting guests. Fall and spring terms. *Prerequisite:* Second-year majors or permission of instructor.

2229, 2230. Theory III and IV. Continuation of Theory I and II covering the Romantic and 20th-century repertoires. Emphasis on traditional harmonization exercises, beginning studies in

musical form, and introduction to current analytical methods. Must be taken in sequence. Fall and spring terms. *Prerequisites:* MUTH 1130, 1230. *Corequisites:* MUTH 2129, 2130.

3110. Keyboard Skills. Score reading in all clefs, sight reading, figured bass realization. *Prerequisites:* MUTH 2130, 2230.

3325, 3326. Composition. Individual study with the composition faculty and regularly scheduled seminars with faculty and visiting guests. Fall and spring terms. *Prerequisite:* Junior major standing or permission of instructor.

3350. Form and Analysis. Study of musical form through examples from pretonal and tonal literatures. *Prerequisites:* MUTH 2130, 2230.

4184, 4284, 4384. Directed Studies in Music Theory. *Prerequisite:* Permission of instructor.

4190, 4290, 4390. Directed Studies in Music Composition. *Prerequisite:* Permission of instructor.

4300. Analysis of Contemporary Music. Detailed analysis of recent music written in a variety of styles and using diverse techniques. The course will also explore early 20th-century antecedents of more recent music. Analysis and discussion will be supported by readings from theoretical articles and composers' writings. *Prerequisites:* MUTH 2130 and 2230.

4310. Introduction to Electro-Acoustic Music. An introduction to the techniques, concepts, and historical perspective of composing, performing, and listening to electroacoustic music. Topics covered include acoustics, psychoacoustics, sound reproduction systems, tape techniques, analog and digital synthesis, and the history and literature of electronic music. Students have three hours of studio time each week to complete required projects. Fall term. *Prerequisite:* Permission of instructor.

4311. Advanced Electro-Acoustic Music. Continuation of the introductory course with an emphasis on mastery of the studio equipment and its application to compositional problems. Students will complete individual and group composition projects in the studio. Spring term. *Prerequisite:* MUTH 4310 or permission of instructor.

4329, 4330. Composition. Individual study with the composition faculty and regularly scheduled seminars with faculty and visiting guests. Fall and spring terms. *Prerequisite:* Fourth-year composition majors or permission of instructor.

5330. Instrumentation and Arranging. An overview of the ranges and performing characteristics of orchestral/band instruments and vocalists, with practical application via scoring and arranging for a variety of small instrumental and vocal ensembles. Fall term. *Prerequisites*: MUTH 2130, 2230.

5360. Advanced orchestration. More advanced techniques of orchestration are explored through a series of scoring projects for a variety of ensembles. Spring term. *Prerequisites:* MUTH 5330 or permission of instructor.

5370. Survey of Counterpoint. Through exercises in analysis and composition, this course provides a study of contrapuntal techniques from the Middle Ages to the 20th century, with emphasis on traditional modal and tonal styles. Prerequisites: MUTH 2130, 2230.

Music Therapy (MUTY)

1120. Clinical Orientation. The study of music therapy assessment, treatment procedures, and evaluation, through observation as well as literature and repertoire review. Each student will participate on a working music therapy team. *Prerequisite:* Permission of instructor.

1220. Introduction to Music Therapy. An overview of the function of the music therapist, the history of the music therapy profession, and music in treatment procedures. Required of all music therapy majors and open to others who may want information about the professional field of music therapy. Fall term.

3130, 3230, 3330. Directed Studies in Music Therapy: Medicine and Health.

3141. Developmental Music Therapy Practicum I. Supervised observation of and therapeutic experience with persons who exhibit developmentally delayed disorders. Fall term. *Corequisite:* MUTY 3211.

3142. Psychiatric Music Therapy Practicum II. Supervised observation of and therapeutic experience with persons who exhibit psychopathological disorders. Fall term. *Corequisite:* MUTY 3212.

3143. Medical Music Therapy Practicum III. Supervised observation and development of clinical skills with patients in medical settings. Spring term. *Corequisite:* MUTY 3213.

3144. Gerontological Music Therapy Practicum IV. Supervised observation and development of clinical skills with elderly clients. Spring term. *Corequisite:* MUTY 3214.

3211. Developmental Music Therapy. A study of music therapy with developmentally disabled children and adults such as mentally retarded, visually disabled, and speech-impaired individuals. Fall term. *Corequisite:* MUTY 3141.

3212. Psychiatric Music Therapy. A study of music therapy with persons with psychopathological disorders such as schizophrenia, depression, and dementia. Fall term. *Corequisite:* MUTY 3142.

3213. Medical Music Therapy. A study of music therapy with the health impaired, such as burn patients, AIDS patients, and obstetric patients. Spring term. *Corequisite:* MUTY 3143.

3214. Gerontological Music Therapy. A study of music therapy with elderly, gerontological clients. Spring term. *Corequisite:* MUTY 3144.

4141. Music Therapy Practicum V. Supervised clinical experience in the treatment and health maintenance of clients with clinical disorders.

4142. Music Therapy Practicum VI. Continued supervised clinical experience in the treatment and health maintenance of clients with clinical disorders.

4144, 4145. Internship in Music Therapy I and II. Six months, or 1,050 clock hours, of continuous full-time music therapy experience in a NAMT-approved clinical facility. Reports from the intern and music therapy supervisor required before, during, and after the internship. Because the internship extends beyond the regular 4 + month term, enrollment for MUTY 4144 will occur for the term during which the internship begins; and for MUTY 4145, the term immediately following. *Prerequisite:* Before the internship, all course, clinical, and preclinical work must be completed in the undergraduate music therapy degree or graduate equivalency program.

4340. Music Psychology: Research, Methods, and Materials. A study of research methods in music psychology, with emphasis on research designs, analysis, and interpretation of research literature in music. Three hours of lecture and one laboratory period each week. Spring term.

4341. Survey of Music Psychology. Basic study of music systems, with emphasis on perception of and responses to musical stimuli. Interpretation of the interdependence of psycho-socio-physiological processes in musical behavior, such as musical ability and preference. Fall term.

5340. Current Topics in Music Therapy. A survey of contemporary trends in music therapy, psychology, and medicine. The universality of music is shown, with applications in modern therapy, medicine, and health. Fall term. *Prerequisite:* Permission of instructor.

5341. Seminar in Clinical Music Therapy. A survey of contemporary trends in music therapy, psychology, and medicine. Through use of group process and self-exploration, students will develop a comprehensive, personalized, and demonstrable theory of clinical music therapy. Spring term. *Prerequisite:* Permission of instructor.

Class Instruction for Performance (PERB)

Harpsichord (PERB)

3115. Harpsichord: Early Music Workshop. Intensive study of harpsichord and continuous playing for advanced players (the complete harpsichord works of Rameau, chamber music with professional players of period instruments). Beginning harpsichord classes for those keyboard players who wish to explore the harpsichord, its techniques and repertoire. Summer term.

5118. Introduction to the Harpsichord. Designed to present a variety of topics related to the harpsichord and its music. Provides keyboard musicians, especially pianists, with knowledge and practical experience at the harpsichord to enable them to face future contacts with the instrument in a more informed, confident, and artistic manner. Spring term of even-numbered years.

5213. Studies in Continuo Playing. Designed for the harpsichord major, to fill the need for a well-developed skill in playing Baroque through bass accompaniments from an unrealized figured bass and/or from an unfigured bass with style performance suitable to the period. Fall term of even-numbered years.

Instrumental (PERB)

1203. Classic Guitar. Basics of reading music; technique; simple chord progressions as applied to popular music; performance of simple classic guitar pieces.

2203. Classic Guitar. Continued development of technical skills and performance repertoire. *Prerequisite:* PERB 1203 or equivalent proficiencies.

3016, 3116. Contemporary Music Workshop. Exploration of contemporary music techniques, including improvisation for instrumentalists and vocalists in a workshop setting. Course work includes master classes on contemporary performance techniques and performance of contemporary chamber works in chamber music recitals, in general music recitals, and in workshop presentations.

3202. Master Class in Classic Guitar. Master classes, lectures, discussions, and recitals. Summer term.

5011, 5111. Directed Studies in Music Performance. Enrollment for directed studies or approved internships in performance or pedagogy.

Piano (PERB)

1131, 1132, 2131, 2132. Class Piano. A four-term sequence required for non-keyboard music majors. Emphasis on sight reading, technique, harmonization, transposition, improvisation, and appropriate literature. Fall and spring terms. *Corequisites:* MUTH 1229, 1230, 2229, 2230; MUTH 1129, 1130, 2129, 2130. Not open to non-music majors.

1205. Beginning Class Piano. Designed for students with no previous piano study. Emphasis placed on the development of basic music reading and functional keyboard skills. Not open to music majors.

1233, 1234. Advanced Class Piano. A two-term sequence (for keyboard majors or advanced non-keyboard music majors). Emphasis on sight reading, harmonization, transposition, improvisation, and technique. Fall and spring terms. *Corequisites:* MUTH 1129, 1229, 1130, 1230.

2205. Elementary Cass Piano. Continued development of fundamental keyboard skills. Emphasis on sight reading, harmonization, transposition, improvisation, technique, and repertoire study. *Prerequisite:* PERB 1205 or equivalent, audition for placement required. Not open to music majors.

Voice (PERB)

1206. Class Voice. A course in basic singing techniques and interpretive skills, suitable for both beginning singers and for students with singing experience but little formal training.

2206. Class Voice. A course in singing techniques and interpretive skills, suitable for students with some singing experience but little formal training. *Prerequisite:* PERB 1206.

2106. Diction: Italian. Principles of pronunciation and enunciation for singing in Italian. Phonetic practice and practical application to the performance of art songs and arias. Fall term.

2108. Diction: English. Principles of pronunciation and enunciation for singing in English. Phonetic practice and practical application to the performance of art songs and arias. Fall term.

2107. Diction: German. Principles of pronunciation and enunciation for singing in German. Phonetic practice and practical application to the performance of art songs and arias. Spring term.

2109. Diction: French. Principles of pronunciation and enunciation for singing in French. Phonetic practice and practical application to the performance of art songs and arias. Spring term.

2017, 2117, 5017, 5117. Meadows Opera Theatre. Preparation, rehearsal, and performance of complete operas and excerpts. Exploration of different operatic styles, basic acting for the operatic stage, role study, and analysis. Operatic coaching experience for pianists. Major production and scenes are offered each year, selected from the broad range of operatic theatre from the 17th to the 20th centuries. For maximum performance experience, it is highly recommended to elect Opera Theatre as a year course.

3310. Music Theatre Workshop. The development of musical theatre as an American art form is examined through historical perspective and performance of excerpts. Some musical background necessary. *Prerequisite:* Permission of instructor.

5101, 5201. Directed Studies in Voice.

5208. Advanced Acting for Voice Majors. Scene study, character development, preparing and researching repertoire, sets, props, and costumes. Fall term. Not repeatable for credit.

Performance Ensembles (PERE)

Large Ensembles (PERE)

1012, 1112. Mustang Marching Band. Experience in preparation and performance of music for field performances. May be taken for large-ensemble credit by majors.

1013, 1113. Meadows Chorale. A select mixed ensemble open to all students by audition.

1014, 1114. Concert Choir. Intermediate choral organization open to all students by audition.

1018, 1118. Meadows Symphony Orchestra. The Symphony is a large orchestra that performs major repertoire. Nonmajors who want an orchestral performance experience are invited to audition.

1019, 1119. Meadows Wind Ensemble. The Wind Ensemble is open to all students on an audition selection basis. Although the majority of the membership is composed of students who are majoring or minoring in music, any University student may apply for an audition. The Wind Ensemble performs a wide variety of literature that encompasses both the symphonic band and wind orchestra idioms.

1076, 1176. Choral Union. A large mixed ensemble that regularly performs major works with instrumental accompaniment. Does not satisfy the vocal or large-ensemble requirement for voice majors or concentrations. *Prerequisite:* Permission of instructor.

Chamber Ensembles (PERE)

1015, 1115. Meadows Jazz Orchestra. Rehearsal and performance of standard and original works for jazz ensembles. By audition.

3016, 3116. Meadows New Music Ensemble. Select instrumental and vocal performers forming the core for a series of concerts devoted exclusively to the performance of new music, through individually coached solo and ensemble performances.

3020, 3120. Meadows World Music Ensemble. Exploration of rhythms, melodies, forms, and basic ethnic percussion techniques from a variety of cultures including Africa, Asia, and Latin America. Composition, improvisation, and performances within forms of ethnic traditions adapted to Western instruments. *Prerequisite:* Music major or consent of instructor.

3030, 3130. Chamber Ensemble: Guitar.

3070, 3170. Chamber Ensemble: Instrumental. Chamber music from the Baroque period to the 20th century. Each ensemble is individually coached. By audition.

3071, 3171. Chamber Ensemble: Keyboard. Chamber music of the past 200 years with piano as a member of a trio, quartet, or quintet with strings or winds. By audition.

3073, 3173. Chamber Ensemble: Percussion. Rehearsal and performance of standard percussion ensemble literature. By audition.

3074, 3174. Chamber Ensemble: Voice. Vocal chamber music from the Renaissance to the 20th century. By audition.

3150, 5150. Chapel Choir. Choir sings for 11 a.m. University Service of Worship (Protestant) on Sundays at Perkins Chapel; 14 services per term. Rehearsal at 9:30 a.m. Sunday.

3075, 3175. Collegium Musicum. An ensemble devoted to the performance on period instruments of Medieval, Renaissance, and Baroque music. Compositional procedures and performance practices also will be examined.

5020. I Palpiti. A select ensemble, required of artist-certificate string students. Open by audition to a limited number of other students according to instrumentation needs. Participation does not substitute for other ensemble assignments.

SPECIALIZED STUDIES IN THE ARTS

The Specialized Studies in the Arts major provides an opportunity for outstanding students to design interdisciplinary programs of study that allow access to fields of inquiry not offered in the curriculum of the Meadows School of the Arts.

Academically qualified students may explore the possibility of a specialized

major in the arts with the Program Director, the Associate Dean for Academic Affairs of the Meadows School of the Arts (214-768-2880). If the proposed plan appears to have merit, the Program Director will suggest faculty members who can provide further assistance in designing the program.

Program Description

Students with at least a 3.50 GPA in the first 24 term hours taken in residence at SMU are eligible to pursue the program.

The program consists of individually designed majors in the arts of at least 36 term hours, with a minimum of at least 24 term hours of advanced courses (3000 level or above). The program must satisfy the General Education Curriculum (GEC) requirements and all other University and Meadows School graduation requirements. Students are responsible for fulfilling all prerequisites for courses taken.

This program is designed as an elite program that will allow exceptional students access to new areas of study; it is not intended to be a way of avoiding divisional requirements. Certain Meadows courses are open only to majors or by audition. Admission to such courses is at the discretion of the faculty of the division in which such courses are offered.

The degree will be identified as a Bachelor of Arts. The transcript will refer to the major as "Specialized Studies in the Arts." A note on the transcript will denote the specialization. Students intending to seek admission to graduate schools are encouraged to include at least 30 hours of a coherent set of courses in an identifiable disciplinary field.

Administrative Procedures

The Meadows Academic Policies Committee shall have the final authority to approve all specialized programs.

Prior to declaring the major, a number of steps must be completed:

1. In order to initiate discussion of an specialized major, a student must submit a preliminary plan of study (a brief statement of goals and a course list) as well a current transcript to the Program Director.
2. If the Program Director approves the program, the student and faculty adviser must form a Supervisory Committee with a minimum of three members. The Supervisory Committee will provide advice and guidance to the student. At least two members, including the chair of the committee, shall be resident members of the Meadows School faculty. The chair of the committee will normally be the faculty adviser.
3. The student will submit a formal plan of study to the Supervisory Committee. The plan of study must include a proposal for a special project such as a thesis, exhibition, or performance. Satisfactory completion (in the judgement of the Supervisory Committee) of this special project is a requirement. If the committee approves the plan, the plan must then be submitted for approval by the Meadows Academic Policies Committee.
4. Once approved by the Meadows Academic Policies Committee, the plan will be transmitted to the office of the Meadows Associate Dean for Student Affairs. The Plan of Study normally should be submitted to the Meadows Academic Policies Committee for approval before the completion of 60 total term hours of course work.
5. The chair of the Supervisory Committee and the Program Director (Meadows Associate Dean for Academic Affairs) will recommend candidates for graduation. The chair of the Supervisory Committee will certify that the required project has been completed to the satisfaction of the Committee. The Supervisory Com-

mittee may recommend that the degree be awarded "with distinction" if the grade point average in the courses required for the major exceeds or equals 3.5 and if the project is deemed excellent. The Associate Dean for Student Affairs will be responsible for verifying and certifying graduation requirements.

THEATRE

Associate Professor Claudia Stephens, **Chair**

Professors: Rhonda Blair, Carole Brandt, Kevin Paul Hofeditz, Cecil O'Neal; **Associate Professors:** Michael Connolly, Charles Helfert, Greg Leaming, Bill Lengfelder, Virginia Ness Ray, Gretchen Smith, Claudia Stephens; **Assistant Professors:** Russell Parkman, Sara Romersberger, Steve Woods; **Visiting Assistant Professor:** James Crawford; **Adjunct Lecturers:** Linda Blase, Steve Leary, Melinda Robinson, Giva Taylor, Kathy Windrow.

Undergraduate education in the Division of Theatre reflects a commitment to the rigorous study of theatre within a liberal arts context. To this end, undergraduate theatre majors pursue course work not only in theatre, but also in the social and natural sciences, literature, the arts and humanities, and other areas of human culture and experience. A faculty adviser works closely with each student to develop a program of study best suited to the individual's needs and career goals. In addition, the Division of Theatre presents an annual season of public productions chosen for their timeliness, public appeal, and suitability for training. Practical experience in all areas of theatre operation is considered a vital part of the educational program.

Instructional Facilities

The Division of Theatre is housed in the well-equipped facilities of the Meadows School of the Arts. These facilities include the Greer Garson Theatre (a 380-seat classical thrust stage), the Bob Hope Theatre (a 400-seat proscenium theatre), the Margo Jones Theatre (a 125-seat "black box" theatre), the Hamon Arts Library, and numerous rehearsal studios.

Admission

Prospective theatre majors at SMU are admitted by audition and interview. All prospective students prepare an audition, consisting of two contrasting monologues and a song. Candidates may also be asked to demonstrate improvisational skills. Students seeking admission into the B.F.A. in Theatre Studies program may also be asked to demonstrate ability in their particular area of interest by supplying writing samples, portfolio materials, etc.

Transfer Students. Admission procedures for applicants seeking to transfer from other schools are the same as those for first-year applicants. Transfer students may begin work only in the fall term.

Evaluation of Progress and Artistic Growth

Students must continually demonstrate a high order of talent and commitment in both class work and production work to progress in the curriculum. At the end of each term the faculty of the Division of Theatre evaluates each student's progress, examining all aspects of a student's academic and production participation.

Every student meets with the faculty to receive this evaluation. An unsatisfactory evaluation is accompanied by the reasons for this evaluation and the terms for continuation in the program. An unsatisfactory evaluation may also result in a student's immediate dismissal from the program.

Degrees and Programs of Study

The Division of Theatre offers the Bachelor of Fine Arts degree in Theatre with a specialization in Theatre Studies, and the Bachelor of Fine Arts degree in Theatre with a specialization in Acting.

When the total number of hours required to satisfy the General Education requirements and the major requirements along with the major's supporting course requirements exceeds 122 term hours, students in such majors will be exempt from three (3) hours of Perspectives and an additional three (3) hours taken from either Perspectives or Cultural Formations.

Bachelor of Fine Arts in Theatre with a Specialization in Theatre Studies

The B.F.A. degree in Theatre with a specialization in Theatre Studies reflects our commitment to theatre training within the context of liberal education. Based on the Division's philosophy that an understanding of and experience with the actor's process is essential to education and training in all areas of theatre, all undergraduate theatre majors focus on foundational actor training during the first two years of their program of study. Focused study in one area of theatre, chosen from Directing, Playwriting, Stage Management, Critical Studies, and Design is required to complete the major. With the approval of the student's theatre adviser and the Chair of the Division of Theatre, this emphasis may be individualized to suit the specific goals of the student. All Theatre Studies students must complete at least 12 hours of upper-level courses among those offered in Directing, Playwriting, Critical Studies, or Design.

	Credit Hours
General Education Curriculum	35
Division of Theatre	
Dramatic Arts Today (THEA 1303, 1304)	6
Stage Makeup (THEA 2263)	2
Running/Construction Crews (THEA 2140, 2141, 2142)	3
Practicum (THEA 2240, 2241, 2242)	6
Acting I, II (THEA 2303, 2304)	6
Voice for the Stage I, II (THEA 2305, 2306)	6
Movement I, II (THEA 2307, 2308)	6
Introduction to Stage Management (THEA 2361)	3
Acting III, IV (THEA 3303, 3304)	6
Text Analysis (THEA 2322)	3
Theatre and Drama History I, II (THEA 3381, 3382)	6
One 12-credit-hour emphasis chosen from: Directing, Playwriting, Stage Management, Design, or Critical Studies	12
Theatre Electives	11
Electives	9
Meadows Elective/Corequirement	3
TOTAL	123

Bachelor of Fine Arts in Theatre with a Specialization in Acting

The B.F.A. degree in Theatre with a Specialization in Acting is a unique program of specialized acting study within a liberal arts context. Although it is concerned with intense study of acting at the highest level, and shares faculty with SMU's graduate professional actor training program, the undergraduate acting major is not, nor does it seek to be, a professional training program. If theatre artists are to make the most meaningful and powerful theatre possible, they must acquire personal and intellectual experience of the world in which they live concurrently with theatre training. Upon completion of two years of foundational actor training, students in the acting major receive advanced training in the areas of acting, stage movement, and stage voice.

	Credit Hours
General Education Curriculum	35
Division of Theatre	
Dramatic Arts Today (THEA 1303, 1304)	6
Stage Makeup (THEA 2263)	2
Running/Construction Crews (THEA 2140, 2141, 2142)	3
Practicum (THEA 2240, 2241, 2242)	6
Acting I, II (THEA 2303, 2304)	6
Voice for the Stage I, II (THEA 2305, 2306)	6
Movement I, II (THEA 2307, 2308)	6
Text Analysis (THEA 2322)	3
Introduction to Stage Management (THEA 2361)	3
Acting III, IV (THEA 3303, 3304)	6
Voice for the Stage III, IV (THEA 3205, 3206)	4
Movement III, IV (THEA 3207, 3208)	4
Theatre and Drama History I, II (THEA 3381, 3382)	6
Acting V, VI (THEA 4303, 4304)	6
Voice for the Stage V, VI (THEA 4105, 4106)	2
Movement V, VI (THEA 4207, 4208)	4
Business and Professional Aspects of the Theatre (THEA 4309)	3
Electives	9
Meadows Elective/Corequirement	3
TOTAL	123

Theatre Courses Open to All University Students (THEA)

The following classes are open to all students. **Please note: There are no performance opportunities for nonmajors.**

1380. Mirror of the Age. Introduction to theatre emphasizing the role of the audience in the experience of performance. Semiotic and communications models are used to explore the dynamic interaction and changing relationship between performance, audience and society. Theatre-going experiences are discussed and analyzed.

2319. Fashion: History and Culture. How and why does what we wear tell us who we are? A study of clothing: its role in and reflection of various historical cultures, including the relationship between fashion, art, architecture, and the decorative arts of selected time periods. For majors and nonmajors.

2321. Spectacle of Performance. Ever wonder how they do that? Spectacle is part of our life and culture. Students will learn to deconstruct spectacle and analyze its influence upon themselves and society at large. Go backstage to experience firsthand how effects are achieved. Students will be required to attend performances in a wide range of "live" venues and discuss what they observe, enabling them to view performance on a critical level. For majors and nonmajors.

3311. The Art of Acting. Basic work in acting, voice, and movement for the nonmajor. Relaxation, concentration, imagination, and the actor's exploration and use of the social world.

3313. Introduction to Design for the Theatre. An analytical study of stage design, including an introduction to the basic history, principles, and languages of stage design. The course will include text analysis, elements and principles of design, and critical discussion of current theatre productions. For majors and nonmajors.

3314. Lighting Design: Theatre, Film, and Television. An introduction to the practice of lighting design. Students will be required to study techniques, complete projects, and make presentations in the discipline.

3316. Scene Design: Theatre, Film, and Television. An introduction to the practice of scenic design. Students will be required to study techniques, complete projects, and makes presentations in the discipline.

3318. Costume Design: Theatre, Film, and Television. An introduction to the practice of costume design. Students will be required to study techniques, complete projects, and make presentations in the discipline.

3381, 3382. Theatre and Drama History I and II. An examination of key moments in the history of Western theatre. Particular attention is given to selected dramatic texts and their social and cultural contexts, and to the dynamic interaction and changing relationship between performance, audience and society as this is influenced by the advent of actors, playwrights, designers, and directors, and by changes in theatre architecture and the social definition of space.

4373. Creative Dramatics. Creative problem-solving using the medium of improvisational theatre. Develops spontaneity and a sense of humor. *Prerequisite:* Permission of instructor.

4381, 4382, 4383, 4384. Studies in Theatre, Drama, and Performance. An examination of selected topics in theatre, drama, and performance. Texts, topics, and critical approaches vary.

Courses For Theatre Majors (THEA)

2101, 2201, 2301, 3101, 3201, 3301, 4101, 4201, 4301, 5301. Directed Study. Independent work with theatre faculty on a specific topic chosen by the student.

1303, 1304. Dramatic Arts Today. An introduction to theatre and performance for entering theatre majors. Considers basic artistic concepts, disciplines, and vocabulary common to this program, providing an elementary foundation in theatre with an emphasis on acting.

2011, 2012. Production. Rehearsal and performance in a Division of Theatre production. *Prerequisite:* Permission of instructor.

2140. Lighting Running/Construction Crew. Practical application of skills and knowledge studied in THEA 2240 to the mounting and running of a theatrical production; involves either serving on the running crew of a Division production or completing 65 hours of work mounting a production. Theatre majors should complete this course by the end of the junior year. Departmental approval required for nonmajors. Must be taken concurrently with *or* subsequent to completion of THEA 2240.

2141. Scenery Running/Construction Crew. Practical application of skills and knowledge studied in THEA 2241 to the mounting and running of a theatrical production; involves either serving on the running crew of a Division production or completing 65 hours of work mounting a production. Theatre majors should complete this course by the end of the junior year. Departmental approval required for nonmajors. Must be taken concurrently with *or* subsequent to completion of THEA 2241.

2142. Costume Running/Construction Crew. Practical application of skills and knowledge studied in THEA 2242 to the mounting and running of a theatrical production; involves either serving on the running crew of a Division production or completing 65 hours of work mounting a production. Theatre majors should complete this course by the end of the junior year. Departmental approval required for nonmajors. Must be taken concurrently with *or* subsequent to completion of THEA 2242.

2240. Lighting Practicum. An introduction to the backstage crafts of theatrical lighting intended to give the student a broad understanding of the basic principles and technical procedures used in the design of lighting. Fifty-hour lab required. Departmental approval required for nonmajors.

2241. Scenery Practicum. An introduction to the backstage crafts of theatrical scenery intended to give the student a broad understanding of the basic principles and technical procedures used in the design of scenery. Fifty-hour lab required. Departmental approval required for nonmajors.

2242. Costume Practicum. An introduction to the backstage crafts of theatrical costume intended to give the student a broad understanding of the basic principles and technical procedures used in the design of costumes. Fifty-hour lab required. Departmental approval required for nonmajors.

2263. Stage Makeup. Instruction in basic makeup, wig and hair styling, and beard building.

2303. Acting I. Exploration of the actor's imagination and the nature of acting, embracing training concepts of ease, honesty, sense memory, and concentration.

2304. Acting II. Beginning script work, in which the actor learns to analyze a scene for its events and to particularize these events in a series of expressive action tasks. Sophomore course. *Prerequisite:* THEA 2303.

2305, 2306. Voice for the Stage I and II. Connecting text/sound impulses to acting challenges, an introduction to breath and volume support, and vocal exercises.

2307. Movement I. Teaches students to individuate internal energies of the body; to use these energies to move the body to create precise statuary mime for the stage; and to begin to synthesize physical listening skills for ensemble acting. Skills taught include juggling, Hatha yoga, corporal mime, illusionistic pantomime, Tai Chi Ch'uan, and the improvising of mime pieces.

2308. Movement for the Stage II. Increases students' physical listening skills and practices these in unarmed stage combat. Skills taught include T'ui Sh'uo, Chi Sao, foil fencing (left and right), French sabre, Kung-fu animals, and conventions of unarmed stage combat. *Prerequisite:* THEA 2307.

2322. Text Analysis. Teaches skills necessary to read a play as an actor, director, playwright, designer, and student of drama. Explores key styles and genres of dramatic literature.

2324. Improvisation. Exercise of actor spontaneity and intuition through theatre games and improvisation.

2361. Introduction to Stage Management. An exploration of the methods and techniques of theatrical stage management, including preproduction planning, scheduling, and conducting rehearsals and performances. Assignments are both theoretical and practical. Permission of instructor required for nonmajors and first-year students.

3011, 3012. Production. Rehearsal and performance in a Division of Theatre production. *Prerequisite:* Permission of instructor.

3205, 3206. Voice for the Stage III and IV. Experiences and exercises designed to free and develop the voice of the actor, explorations of speech sounds, text work. Alleviating physical barriers to sound production, beginning to discover a full vocal range of 2-3 octaves. *Prerequisites:* THEA 2305, 2306.

3207. Movement III. Teaches extension of energy and physical listening skills. Skills taught include quarterstaff, rapier and dagger, court sword, and broad sword. *Prerequisite:* THEA 2308.

3208. Movement IV. Allows the student to process personal experience into the movement and sound of a character. Skills taught include clowning, LeCoq figures, and neutral mask. *Prerequisite:* THEA 3207.

3219. Musical Theatre Acting and Performance. The basics of acting in musical theatre: script analysis, blocking, character development, and scene study. Includes introduction to musical theatre movement and audition techniques. Students will culminate this course with a series of performed musical scenes. *Prerequisite:* Departmental approval.

3303. Acting III. A synthesis of first- and second-year work to the end of an individual system by which actors approach the presentation of characters through their ability to present themselves effectively. *Prerequisite:* THEA 2302.

3304. Acting IV. Continuation and extension of THEA 3303, consisting of special projects in characterization studies. *Prerequisite*: THEA 3303.

3331. Playwriting I. Creative exploration in the development of performance scripts with emphasis on structural vocabularies of story, plot, character development, and dramatic action.

3332. Playwriting II. Intermediate techniques of playwriting with emphasis on developing individual style and voice; writing one-act plays. *Prerequisite:* THEA 3331.

3341. Directing I: An introduction to the practices and methods of directing. Includes study in the work of major directorial innovators. Directing projects required.

3342. Directing II. An intermediate-level course extending the work of THEA 3341. Final projects include the staging of a one-act play. *Prerequisite:* THEA 3341.

3361, 3362. Stage Management I. Fuller explanation of the methods and techniques of theatrical stage management. *Prerequisite:* THEA 2361.

4011, 4012. Production. Rehearsal and performance in a Division of Theatre production. *Prerequisite:* Permission of instructor.

4105. Voice for the Stage V. A continuation of the voice curriculum to further enrich the actor's technique and address any outstanding issues in the work. The vocal workout keeps the actor in tune with his/her instrument while preparing to enter the profession. *Prerequisite:* Permission of instructor.

4106. Voice for the Stage VI. A continuation of the voice curriculum including the study of the International Phonetic Alphabet and dialect/accent work and the addition of specific skills for a variety of media. Cold reading skills, studio time and use of microphones, and commercial work for radio and television spots are addressed. *Prerequisite:* Permission of instructor.

4204. Acting for the Camera. An intensive approach to acting for film and television. Students will work with actual scripts and copy.

4207. Movement V. An exploration of historical movement and dance including selected dances, movements, and manners of the 16th through the 20th centuries, focusing on the embodiment of the style of those periods. Emphasis is placed on the dress, movement, and manners of the Renaissance and Classic Baroque periods. *Prerequisite:* Permission of instructor.

4208. Movement VI. Physical self-study explored through mask work including Neutral Mask, the masks of the commedia dell'arte, Character Mask, and European Clown. The exploration begins with finding a physical neutral, moves through the playing of the stock masked *commedia* characters and their counterparts in plays by Shakespeare and Moliere, and culminates with finding one's own personal clown. *Prerequisite:* Permission of instructor.

4303, 4304. Acting V and VI. An actor's approach to classic texts through scene study, monologues, and lecture/demonstration. Emphasis is on Shakespeare and his contemporaries.

4309. Business and Professional Aspects of the Theatre. A preparation for graduating actors that includes compiling résumés, photographs, use of cold readings, monologues, and scene work with a variety of scripts for repertory or summer theatre casting.

4331. Playwriting III. Advanced work in the development of performance scripts for the stage with emphasis on full-length works. *Prerequisite:* THEA 3332.

4332. Playwriting IV. Advanced techniques of writing for the stage, including rehearsal and performance or produced theatrical event. Focuses on professional aspects of playwriting. *Prerequisite:* THEA 4331.

4341. Directing III. Advanced project studies in stage direction with emphasis on the interplay between director and other artistic collaborators (playwrights and/or designers). *Prerequisite:* THEA 3342.

4342. Directing IV. Advanced techniques in the interpretation of established dramatic literature and/or creation of original work for the stage. Emphasis on collaboration between director and playwright. This course is for the student seriously considering directing as a career. Time will be spent on exploring professional career choices for the young director. *Prerequisite:* THEA 4341.

4351. Historical Cultures Within Theatrical Design. Using the elements of design, the course will focus on the exploration of political, social, economic, and artistic influences of various artistic cultures in history, and how the designer uses this information to create a theatrical production, film, or opera. Junior/senior-level course.

4361, 4362. Stage Management II. Fuller explanation of the methods and techniques of theatrical stage management. *Prerequisite:* THEA 3361, 3362.

5398, 5399. Production Research and Development. Script analysis, background research, and performance design for the actor, designer, director and dramaturg.

SCHOOL OF ENGINEERING GENERAL INFORMATION

The School of Engineering traces its roots to 1925, when the Technical Club of Dallas, a professional organization of practicing engineers, petitioned SMU to fulfill the need for an engineering school in the Southwest. In response to the club's request, the School of Engineering began one of the first cooperative education programs in the United States, a program that continues to put engineering students to work on real technical projects today.

Included in the School of Engineering curricula are programs in civil engineering, electrical engineering, environmental engineering, environmental science, computer engineering, computer science, management science, mechanical engineering, and telecommunications systems. In 2000 the School of Engineering introduced Engineering and Beyond, a variety of programs within the School of Engineering designed to provide a generous mix of a traditional engineering curriculum and selected leadership coursework. This leadership coursework is designed to train engineering students for futures in management, entrepreneurship, and beyond.

Corporate support for the engineering school has generated a remarkable array of equipment and laboratories. Recent additions include the AT&T Mixed Signals Lab, the Texas Instruments Digital Signal Processing Lab, the Proctor and Gamble Biomedical Research Lab, and the Nokia Wireless Communication Lab. Other laboratories include the Laser Micromachining Lab, and the Nanoscale Electrothermal Science Lab. In addition SMU Engineering is the home of the Research Center for Advanced Manufacturing (RCAM). RCAM provides the intellectual foundation for industry to collaborate with faculty and students to resolve generic, long-range challenges, thereby producing the knowledge base for steady advances in technology and their speedy transition to the marketplace. The Dallas area's national prominence in high technology and research has been beneficial to the School of Engineering and our students.

The School of Engineering is a founder and charter member of the Association for Media-based Continuing Education for Engineers (AMCEE), a nationwide consortium of engineering schools that offer videotape/DVD continuing education courses. In addition, the school is a founding member of the National Technological University (NTU), which offers engineering education to students across the country via videotape, DVD, and online.

PROFESSIONAL ENGINEERING REGISTRATION

All senior-year engineering students are encouraged to take the first part of the examination for professional engineering licensure in the state of Texas. This is known as the *Fundamentals of Engineering Examination* and is given twice each year, in early April and early October. The School of Engineering provides a review course to prepare students for the exam. Application forms for the examination may be obtained from the Office of the Dean.

PROGRAM INFORMATION

All programs of education and research in engineering are conducted through the School of Engineering. The school is organized into the following departments:

Computer Science and Engineering (CSE)
Electrical Engineering (EE)
Engineering Management, Information, and Systems (EMIS)
Environmental and Civil Engineering (ENCE)
Mechanical Engineering (ME)

The School of Engineering offers curricula leading to the Bachelor of Science

degree in the following programs (the department responsible for each program is indicated in parentheses):

Civil Engineering (ENCE)
Computer Engineering (CSE)
Computer Science (CSE)
Electrical Engineering (EE)
Environmental Engineering (ENCE)
Environmental Science (ENCE)
Management Science (EMIS)
Mechanical Engineering (ME)
Telecommunications Systems (EE)

Each curriculum is under the jurisdiction of the faculty of the department in which the program is offered.

The School of Engineering also offers graduate programs toward the degrees of Master of Science, Doctor of Engineering, and Doctor of Philosophy.

The departments are the School of Engineering's basic operating and budgetary units. Each department is responsible for the development and operation of its laboratories at all levels of activity and for all purposes; for the content, teaching, and scheduling of its academic courses; and for the conduct of research programs. The chief administrative officer of each department is the department chair, who reports directly to the Dean.

Every effort has been made to include in this publication information that, at the time of preparation for printing, most accurately represents SMU within the context in which it was offered. The provisions of this publication are not, however, to be regarded as an irrevocable contract between the student and SMU. The University reserves the right to change or terminate, at any time and without prior notice, any provision or requirement including, but not limited to, policies, procedures, charges, academic programs, videotaped courses, and television courses offered through The Green Network.

More information on the School of Engineering and its programs is available at www.engr.smu.edu.

UNDERGRADUATE ENGINEERING INTERNSHIP PROGRAM

This program is intended to allow students who enroll as full-time students to include a maximum of three semesters of professional work experience during the course of their study. Students must have obtained junior level class status prior to participating in work experience. Students cannot simultaneously enroll in a full-time load of course work **and** participate in a full-time work experience. A "full-time" course of study is defined as 12 or more credit hours per semester and a "full-time" work experience is defined as a minimum of 37.5 hours worked per week. In order to preserve satisfactory academic achievement, students enrolled in a full-time course load shall not work more than a maximum of 20 hours a week. Students who are actively participating in a full-time work experience shall not enroll in more than 9 credit hours a semester. Zero hours of credit will be awarded for each semester of internship. Participation in this program will not jeopardize the full-time status of international students.

Students who wish to participate in this program will need to receive an internship job offer relating to their major.

- Provide a job description to the Office of Undergraduate Professional Experience Programs.
- Complete the "Undergraduate Engineering Internship Program Agreement" form.
- Obtain the following approvals: Faculty Adviser, Department Chair, Director of Undergraduate Professional Experience Programs, International Student Office (for all international students).

Once the necessary approvals are obtained, the student must register for the Undergraduate Internship Program course that is designated by the student's department (CSE 5050, EE 5050, EMIS 5050, ENCE 5050, ME 5050).

Upon conclusion of the work assignment, the student must submit a report outlining the activities and duties of the internship within two weeks of the end of the semester or at the end of the internship, whichever comes first. The student will submit a copy of the report to the Faculty Adviser, the International Office (if applicable), and the Director of Undergraduate Professional Experience Programs of the School of Engineering. The Director of Undergraduate Professional Experience Programs, in consultation with the student's adviser, will assess the report and recommend a grade of Satisfactory "S" or Unsatisfactory "U" to the Associate Dean for Academic Affairs within two weeks of receiving the report. The students work experience will be validated and recognized on the permanent transcript.

Cooperative Education

The history of the School of Engineering at SMU demonstrates a commitment to the concept of cooperative education. When the School of Engineering was established in 1925, it already had a close relationship with the Technical Club of Dallas. Members of this group owned factories and engineering consulting firms and wanted to participate in the training and development of their incoming employees. The Technical Club asked SMU to include the Cooperative Education Program (Co-op) in the original design of the school.

SMU was one of the first universities in the Southwest to adopt this concept of practical education. From 1925 to 1965, all School of Engineering undergraduate students participated in Co-op. Since 1965, the program has been optional.

In 1999, SMU became one of the first universities to receive accreditation from the newly formed Accreditation Council for Cooperative Education (ACCE). The SMU program is one of 11 professional work-based university programs to receive ACCE accreditation, and one of only two Texas universities to earn this distinction.

The SMU Co-op Program is designed so that each student can enhance his or her education and career by receiving professional training while alternating terms of classroom instruction. Participation in the Co-op Program allows students to:

- Confirm that they like working in their major.
- Discover the kind of work they like within their major.
- Establish a professional reputation.
- Earn the cumulative equivalent of one year of a new graduate's starting salary before graduation.
- Gain invaluable work experience when competing for full-time jobs upon graduation.

HOW THE COOPERATIVE PROGRAM OPERATES

Entry into the Co-op Program typically is offered at either of two times during the student's academic progression. These are shown below:

Plan A	**5 Work Terms**		
	Fall	***Spring***	***Summer***
First Year	SMU	SMU	Free
Sophomore	SMU	Industry	SMU
Junior	Industry	SMU	Industry
Senior 4th	SMU	Industry	SMU
Senior 5th	Industry	SMU	

Plan B	**4 Work Terms**		
	Fall	***Spring***	***Summer***
First Year	SMU	SMU	Free
Sophomore	SMU	SMU	Free
Junior	Industry	SMU	Industry
Senior 4th	SMU	Industry	SMU
Senior 5th	Industry	SMU	

Students who want to participate in the Co-op Program should begin the application process two terms before their anticipated first work term. The application process includes attending a Co-op Orientation (preferably during the first year), receiving interview skills training, learning the job search process, and completing a computerized application. The Co-op Director guides students through each step of the process.

Each applicant receives quality advising from the Co-op Director. A direct result of advising is that the student gains a better understanding of individual options and a strategy for pursuing those options. The application process requires one or two hours per week for almost two terms. The process normally results in an offer of Cooperative Education Training Employment beginning in the spring term during the sophomore year or the fall term of the junior year.

Who May Apply?

Any School of Engineering undergraduate student in good standing who has enough time remaining before graduation to alternate at least three times between terms of full-time work and terms of full-time school may apply for admission into the SMU Co-op Program. Transfer students must be admitted and accepted at SMU.

When To Apply

- Many students choose to begin the application process during the first term of their first year. This head start is especially beneficial for students planning to participate in Greek Rush during the second term of their first year.
- Two or more terms before the work term begins.
- The first of these terms is for preparation.
- The second is for applying/interviewing with companies.

POLICIES OF THE COOPERATIVE ENGINEERING EDUCATION PROGRAM

Since 1925, SMU School of Engineering has created and maintained numerous strong corporate relationships. Many factors contribute to these relationships, including the quality of the academics and research, the advancement of alumni, and SMU's close proximity to high-tech corporations. An SMU Co-op student directly benefits from these relationships.

However, the student bears an obligation to preserve these relationships for future students by following SMU's School of Engineering Co-op Program Undergraduate Student Agreement. The agreement balances the student's individual needs with the long-term goal of maintaining corporate relationships so that future SMU students will have as many opportunities as possible.

- Students must maintain good standing with SMU and their employer at all times.
- All Co-op Training Jobs must be approved in advance by the SMU Co-op Director.
- Before each work term begins, each undergraduate Co-op student must enroll in the appropriate Co-op course for the term when they work.
- SMU charges no fees or tuition for these courses. Each course is graded as pass/fail by the Co-op Director. The courses do not count toward graduation. The course numbers for each work term are, respectively, SS 1099, SS 2099, SS 3099, SS 4099, SS 5099, and SS 6099.
- Students enroll at SMU each term, including summers, once they begin the Co-op rotation between work and school.
- Co-op students take full-time class loads at SMU during alternating school terms.
- Co-op students do not work part-time for the Co-op employer during school terms.
- Co-op students complete all work terms with the same company.
- Once a student accepts a Co-op Training Job, the student may switch jobs within the sponsoring company with the approval of the company.
- Each Co-op student completes their originally planned number and sequence of alternating work terms. The term of graduation must be a term of full-time study at SMU.
- Each Co-op student accepts responsibility for knowing and following all Co-op regulations of SMU and the participating employer.

CO-OP CERTIFICATE

Co-op students who plan and complete all originally scheduled Co-op work terms in good standing with the University and the Co-op Office receive a Co-op Program Certificate to coincide with graduation.

For additional information, contact the Co-op Director at 214-768-3033 or by e-mail at coop@engr.smu.edu. The Co-op Office welcomes visitors and is in the School of Engineering in room 101 of Caruth Hall.

ADMISSION

For detailed information regarding Southern Methodist University's admission requirements, regulations, and procedures, see the University Admission section of this catalog.

Prospective students interested in undergraduate degrees in engineering apply for undergraduate admission to SMU as first-year or transfer students through the Office of Admission, Southern Methodist University, PO Box 750181, Dallas TX 75275-0181.

All first-year applicants admitted to SMU initially enter Dedman College. For students interested in majoring in engineering, a personal interview with the Office of Admission and the School of Engineering Undergraduate Enrollment Office is highly recommended. The School of Engineering Office of Undergraduate Enrollment and student development can be reached at 214-768-3041.

HIGH SCHOOL PREPARATION

Because of the high standards of the School of Engineering and the rigorous character of its curricula, it is essential that the entering student be well prepared in basic academic subjects in high school.

The usual high-school preparation for entrance into SMU and study in engineering includes the following courses:

English	4 units
Mathematics	4-5 units
Physics, Chemistry, Biology	At least 3 units
Social Studies	2 units
Foreign Language	2 units
Computer Programming	1 unit

However, a minimum of 15 academic units is required for admission. The courses listed above, with the exception of foreign languages, are recommended but are not required.

Most recently, students admitted to SMU with the intention of majoring in engineering were the most competitive applicants. To be successful in SMU engineering programs, the student *should* have the following academic strengths:

1. Enrollment in an appropriate program of study in high school, as outlined above.
2. Rank in the upper third of his or her graduating high school class.
3. Have a minimum SAT composite of 1100 with at least a 600 math score. Equivalent ACT scores may also be submitted.

These guidelines should assist students interested in studying engineering at SMU.

ADMISSION TO ADVANCED STANDING

Admission from Dedman College and Other Schools Within SMU

After completion of the first year, admission to the School of Engineering is accomplished by an interschool transfer. These transfers are approved by the Assistant Dean of Undergraduate Studies. For admission, a student must have completed 24 credit hours and must demonstrate the ability to achieve academic success in engineering or applied science by attaining a 2.00 or higher G.P.A. For admission into the civil engineering, computer engineering, electrical engineering, environmental engineering, or mechanical engineering program, a 2.00 or higher G.P.A. is required in the following five courses: ENGL 1301, ENGL 1302 or equivalent, MATH 1337, MATH 1338, and PHYS 1303. For admission into either the computer

science or management science program, a 2.00 or higher G.P.A. is required in the following six courses: ENGL 1301, ENGL 1302 or equivalent, MATH 1337, MATH 1338, CSE 1341, and CSE 2341. If a course is repeated, both grades will be used in computing the G.P.A.

Admission by Transfer from Another Institution

An undergraduate at a junior college, college, or university may apply for admission to the School of Engineering. Admission will be granted provided the prior academic records and reasons for transfer are acceptable to the School of Engineering. Transfer credit will be awarded in courses that have identifiable counterparts in curricula of the School of Engineering, provided they carry grades of *C* or better. Transfer students will be expected to meet requirements equivalent to students admitted from Dedman College and other schools within SMU.

Transfer credit is awarded only for work completed at institutions that are regionally accredited. Because of SMU's 60-term-hour residency requirement for a Bachelor's degree, there is a limit on the total amount of credit that may be transferred from four-year institutions.

GRADUATION REQUIREMENTS FOR BACCALAUREATE DEGREES

Graduation from the School of Engineering with a Bachelor's degree requires that the following standards of academic performance be met:

1. A passing grade must be received in every course in the prescribed curriculum.
2. An overall G.P.A. of 2.00 or better must be attained in all college and university courses.
3. An overall G.P.A. of 2.00 or better must be attained in all course work attempted at SMU for the degree.
4. An overall G.P.A. of 2.00 or better must be attained in all course work attempted for the degree in the major field of study.
5. A minimum of 122 term hours of credit, including 35-41 hours in the General Education Curriculum and the requirements for a major in engineering or applied science.

Residence Requirements

For graduation from the School of Engineering, 60 term credit hours must be earned in residence, including 30 term credit hours in the major department or interdisciplinary program. Of the last 60 term credit hours earned toward a degree, 45 must be in residence. Exceptions to this requirement will be made only under unusual circumstances at the discretion of the School of Engineering faculty.

The Major

A candidate for a degree must complete the requirements for a major in one of the departments of the School of Engineering. The major requirements of each department and program are stated in the next section. The applicable requirements of the major are those in effect during the academic year in which the major is declared, or those of a subsequent academic year. Course work counting toward a major may not be taken Pass/Fail. Majors must be officially declared (or changed) through the Office of the Assistant Dean of Undergraduate Studies.

GENERAL EDUCATION PROGRAM

All SMU undergraduate students have a common college requirement that is designed to assure them of a broad liberal education regardless of how specialized their majors might be. This requirement is so that each student learns to reason and think for oneself; becomes skilled in communicating meaning and in understanding it; understands something about both the social and the natural worlds and one's own place and responsibilities in them; and understands and appreciates human culture and history in their various forms, including religion, philosophy, and the arts.

The general education requirements for the School of Engineering program must follow the requirements of the University. See the General Education Curriculum section of this catalog for more information.

PROGRAMS OF STUDY

The School of Engineering offers the following degrees:

Bachelor of Science in Civil Engineering
Bachelor of Science in Computer Engineering
Bachelor of Science in Electrical Engineering
Bachelor of Science in Environmental Engineering
Bachelor of Science (Environmental Science)
Bachelor of Science in Mechanical Engineering
Bachelor of Science (Computer Science)
Bachelor of Arts (Computer Science)
Bachelor of Science (Management Science)
Bachelor of Science (Telecommunications Systems)

Engineering work can be classified by function, regardless of the branch it is in, as follows: research, development, design, production, testing, planning, sales, service, construction, operation, teaching, consulting, and management. The function fulfilled by an engineer results in large measure from personal characteristics and motivations, and only partially from his or her curriculum of study. Nonetheless, although engineering curricula may be relatively uniform, their modes of presentation tend to point a student toward a particular large class of functions. Engineering curricula at SMU aim generally at engineering functions that include research, development, design, management, and teaching — functions ordinarily associated with additional education beyond the Bachelor's degree.

The curricula in computer engineering, computer science, electrical engineering, environmental engineering, and mechanical engineering are accredited by the Accreditation Board for Engineering and Technology (ABET). The School of Engineering has the following common educational objectives for ABET accredited programs as well as programs that seek ABET accreditation:

1. Graduates will obtain the appropriate interdisciplinary knowledge to assume leadership and management positions.
2. Graduates will obtain the skills necessary to function and communicate effectively, both individually and in multidisciplinary teams, in culturally diverse and changing technical environments.
3. Graduates will obtain a broad education with exposure to contemporary issues and professional ethics, laying a foundation for lifelong learning.

The School of Engineering is engaged in an ongoing assessment process that evaluates its success in meeting these school-wide objectives as well as individual program-specific objectives and enhances development of its programs.

JUNIOR YEAR ABROAD

Many undergraduates in American universities have found it academically and culturally rewarding to spend their junior year at a university in another country. This opportunity has rarely been used by students concentrating in programs in engineering because of the integrated nature of curricula in these fields. However, as a result of arrangements with the Colleges in the University of London in England and the University of Perth, Australia, it is now possible for undergraduates in the School of Engineering to undertake their junior year abroad without delaying their progress toward a baccalaureate degree.

To be eligible for this program, students should normally have attained a G.P.A. of at least 3.00 and also have the academic and social maturity needed to adapt to the different academic and social customs. For detailed information about this program, students should consult their Academic Advisers and the Undergraduate Dean in the School of Engineering early in their sophomore year.

DESCRIPTION OF COURSES

Courses offered in the School of Engineering are identified by a two- or three-letter prefix code designating the general subject area of the course, followed by a four-digit number. The first digit specifies the approximate level of the course as follows: 1 – first year, 2 – sophomore, 3 – junior, 4 – senior, and 5 – senior. The second digit denotes the term-hours associated with the course. The last two digits specify the course numbers. Thus, CSE 4322 denotes a course offered by the Department of Computer Science and Engineering at the senior (4) level, having three term hours, and with the course number 22. The prefix codes are as follows:

CSE — Department of Computer Science and Engineering
EE — Department of Electrical Engineering
EMIS — Department of Engineering Management, Information, and Systems
ENCE — Department of Environmental and Civil Engineering
ME — Department of Mechanical Engineering
SS — Center for Special Studies

COMPUTER SCIENCE AND ENGINEERING

Professor Hesham El-Rewini, **Chair**

Professors: Margaret Dunham, Hesham El-Rewini, David Matula, Stephen Szygenda; **Associate Professors:** Thomas Chen, James Dunham, Richard Helgason, Sukumaran Nair, Mitchell Thornton, Jeff Tian; **Assistant Professors:** Fatih Kocan, Saadeddine Mneimneh; Peter-Michael Seidel; **Lecturers:** Frank Coyle, Donald Evans, Judy Etchison; **Adjunct Faculty:** William Bralick, Ann Broihier, Hakki Çankaya, Mark Fontenot, Dennis Frailey, Dale Gutt, G.N. Kartha, Kamran Khan, Mohamed Khalil, Chantale Laurent-Rice, Babu Mani, Lee McFearin, Riad Mohamed, Freeman Moore, Robert Oshana, Marius Pasca, Krish Pillai, John Pfister, Mohamed Rayes, Alfred Riccomi, Stephen Stepoway, Yanjun Zhang.

The department of Computer Science and Engineering at SMU offers academic programs in computer engineering and computer science. Faculty specializations include computer architecture, knowledge engineering, software engineering, design and analysis of algorithms, parallel processing, database and information systems, VLSI CAD methods, bioinformatics, computer networks, data and network security, mobile computing, theory of computation, and computer arithmetic. The educational objectives of the undergraduate programs in the department are to produce graduates who are productive professionals in an information technology discipline, are pursuing (have pursued) graduate or professional degrees, are successful entrepreneurs and managers, have a broad knowledge and wide range of interests, are valuable members of their general community, and take a leadership role in their chosen field. As such, the programs are designed to ensure that graduates:

1. Have a thorough understanding of personal and professional ethics.
2. Can effectively communicate engineering problems and solutions, both in an oral and written format.
3. Have demonstrated the ability to apply mathematical knowledge to software/architectural design problems. This includes a basic mathematical background in discrete math, differential and integral calculus, and probability and statistics.
4. Have demonstrated the ability to apply scientific knowledge.
5. Have demonstrated the ability to apply software engineering principles to the design and implementation of large software systems.
6. Are able to design, conduct, and evaluate experiments concerning software and/or hardware solutions.
7. Have demonstrated the ability to function on a multidisciplinary team using current software or computer engineering tools and techniques.

8. Have received a broad liberal arts education sufficient to understand the international implications and needs of software systems.
9. Have demonstrated a basic understanding of core Computer Science or Computer Engineering topics.

The CSE Department is engaged in an ongoing assessment process that evaluates the success in meeting these objectives and enhances the development of the program.

Degrees

Bachelor of Science — Major in Computer Science (122 Term Credit Hours)
Bachelor of Science — Major in Computer Science with a Premedical Specialization (132 Term Credit Hours)
Bachelor of Science in Computer Engineering (123 Term Credit Hours)
Bachelor of Arts — Major in Computer Science (122 Term Credit Hours)

All B.S. degrees are accredited by ABET.

Dual Degree Program

The School of Engineering offers a dual degree with the Meadows School of the Arts that leads to the degrees of Bachelor of Arts in Music and Bachelor of Arts in Computer Science. Please contact the department for additional details.

4+1 Master's Degree Program

The 4+1 Program allows students to complete both B.S. and M.S. degrees in five years. In the CSE department, students may participate in a 4+1 program in either the Computer Science or Computer Engineering area. Up to nine TCHs of graduate courses may be applied toward fulfilling the student's undergraduate program requirements. For additional information, contact the Undergraduate Program Director.

Teaching Certification

The teacher certification program requires 24 hours of course work and six hours of student teaching. Thus a B.A. CS student is able to complete these requirements with two additional hours of course work and the student teaching. For information on this, please contact the Undergraduate Program Director.

Computing Facilities

Students in the Department of Computer Science and Engineering have access to a wide range of facilities and equipment. The department's computing environment is 100BaseT switched Ethernet with Gigabit Ethernet in the core. General use UNIX machines consist primarily of 12 Alpha-based machines, five SUN-Sparc machines, and three Dual-Intel-Zeon based Linux machines. Windows-based PCs are the primary desktop with X terminals also available. Desktops are made available in labs for classes and also in open study areas. Wireless access also is available in study areas.

Curriculum in Computer Science

Computers play an ever-increasing role in our society. Their use permeates all other academic disciplines and industrial arenas. Computer science is the study of the concepts and theory surrounding computer design and software construction. The SMU undergraduate program in Computer Science provides the student with a solid understanding of these concepts, which provides him or her with the technical knowledge needed to pursue either an advanced degree or a challenging career in the computer industry. The diversity of the School of Engineering computer environ-

ment exposes undergraduate computer science students to many different hardware and software systems.

To study and use computers we must communicate with them through a variety of software interfaces, including programming languages. At SMU the student will study several high-level languages — such as C++ and Java — that simplify the use of computers. In addition, the student is exposed to a variety of Computer Aided Software Engineering (CASE) tools and expert systems shells. Assembly languages and operating systems (such as UNIX) for micro-, mini-, and mainframe computers are studied to provide an understanding of the architecture and organization of a digital computer. Mathematical topics such as discrete mathematics and data structures, graph theory, and Boolean and linear algebra are taken by undergraduates so that they may better understand the internal structure of the computer and the effective utilization of its languages.

Knowledge of the computer's internal structure is important to understanding its capabilities. Thus, the Computer Science student will take courses in assembly language, computer logic, and computer organization. Courses in systems programming and operating systems extend this structural study into the "software" of the computer. A required sequence of software engineering courses prepares our students for advanced systems and software applications.

The free electives in the Computer Science program can also be used to individually tailor a student's study plan. For example, a student desiring a program even more intensive than the Computer Science major could satisfy his or her free electives with more Computer Science courses. A student wishing to obtain a broader education could satisfy these electives with courses offered by any department in the University.

Bachelor of Science with a Major in Computer Science
Curriculum Requirements

Area	*Required Courses*	*TCH*
Liberal Studies:	ENGL 1301, 1302	6
	Perspectives	15
	Cultural Formations	6
(One Perspectives course *or* one Cultural Formations course must satisfy the Human Diversity requirement.)		
Mathematics:	MATH 1337, 1338, 3353	9
	CSE 2353	3
	CSE 3365, 4340	6
Science:	PHYS 1105, 1106, 1303, 1304	8
	Six TCH from the following list of courses:	6
	ANTH 2315, 2363 BIOL 1401, 1402 CHEM 1113/1303, 1114/1304, 1307, 1308 GEOL 1301, 1305, 1307, 1308, 1313 PHYS 3305	
Computer Science:	CSE 1341, 2240, 2341, 3381, 3342, 3345, 3353, 3358, 4344, 4345, 4346, 4381, 5343	38

Area	*Required Courses*	*TCH*
	6 TCH to be selected from the following list: CSE 5314, 5320, 5330, 5339, 5341, 5342, 5344, 5345, 5348, 5349, 5350, 5359, 5376, 5380, 5381, 5382, 5385, 5387	6
Engineering Leadership	CSE 4360, EMIS 3308, EMIS 3309, ENCE 3302	12
Wellness:		2
Free Electives:	Must be approved by the adviser	5
		122

Bachelor of Science with a Major in Computer Science with Premedical Specialization

Curriculum Requirements:

Area	*Required Courses*	*TCH*
Liberal Studies:	ENGL 1301, 1302	6
	Perspectives	9-12
	Cultural Formations	3-6
(One Perspectives course *or* one Cultural Formations course must satisfy the Human Diversity requirement.)		15
Mathematics:	MATH 1337, 1338, 3353	9
	CSE 2353	3
	CSE 3365, 4340	6
Science:	PHYS 1105, 1106, 1303, 1304	8
	BIOL 1401, 1402, 3304, 3306	14
	CHEM 1303, 1304; 1113; 1114; 3117; 3118; 3371, 3372	16
Computer Science:	CSE 1341, 2240, 2341, 3381, 3342, 3345, 3353, 3358, 4344, 4345, 4346, 4381, 5343	38
	3 TCH to be chosen from the following: CSE 5314, 5320, 5330, 5339, 5341, 5342, 5344, 5345, 5348, 5349, 5350, 5359, 5376, 5380, 5381, 5382, 5385, 5387	3
Engineering Leadership:	CSE 4360, EMIS 3308, EMIS 3309, ENCE 3302	12
Wellness:		2
		132

Bachelor of Arts with a Major in Computer Science

Curriculum Requirements

Area	*Required Courses*	*TCH*
Liberal Studies:	ENGL 1301, 1302	6
	Perspectives	15
	Cultural Formations	6

(One Perspectives course *or* one Cultural Formations course must satisfy the Human Diversity requirement.)

Area	*Required Courses*	*TCH*
Mathematics:	MATH 1337, 1338	6
	CSE 2353	3
	STAT 2331	3
Science:	PHYS 1313	3
	Three TCH from the following list of courses: ANTH 2315, 2363 BIOL 1303, 1305, 1306, 1307, 1308, 1401, 1402 CHEM 1301, 1302, 1303, 1304, 1307, 1308 GEOL 1301, 1305, 1307, 1308, 1313 PHYS 1303, 1304, 1309, 1314, 1407, 1408, 3305	3
Computer Science:	CSE 1341, 2240, 2341, 3381, 3342, 3345, 3358, 4344, 4345, 4346, 4381, 5343	35
	Six TCH to be chosen from the following: CSE 5314, 5320, 5330, 5339, 5341, 5342, 5344, 5345, 5348, 5349, 5350, 5359, 5376, 5380, 5381, 5382, 5385, 5387	6
Engineering Leadership:	CSE 4360, EMIS 3308, EMIS 3309, ENCE 3302	12
Free Electives:	The free electives must be approved by the adviser.	22
Wellness:		2
		122

Minor In Computer Science

A student majoring in Computer Engineering may not minor in computer science.

Requirements:

CSE 1341 Principles of Computer Science I
CSE 2341 Principles of Computer Science II
CSE 2353 Discrete Computational Structures
CSE 3358 Data Structures

Elective Courses:

Any six hours of CSE courses numbered 3000 or above as approved by the CS Minor Adviser.

Curriculum in Computer Engineering

Computer engineering deals with computers and computing systems. The computer engineer must be capable of addressing problems in hardware, software, and algorithms, especially those problems whose solutions depend upon the interaction of these elements.

The career opportunities of the computer engineer will require a broad range of knowledge. The design and analysis of logical and arithmetic processes that are the basis of computer science provides basic knowledge. Computer engineering courses are concentrated on the interacting nature of hardware and software. Basic electrical engineering is a clear foundation for the computer engineer.

Bachelor of Science with a Major in Computer Engineering
Curriculum Requirements

Area	*Required Courses*	*TCH*
Liberal Studies:	ENGL 1301, 1302	6

Area	*Required Courses*	*TCH*
	Perspectives	9-12
	Cultural Formations	3-6
(One Perspectives course *or* one Cultural Formations course must satisfy the Human Diversity requirement.)		15
Mathematics:	MATH 1337, 1338, 2343, 3353	12
	CSE 2353, 3365, 4340	9
Science:	PHYS 1106, 1303, 1304	7
	CHEM 1303	3
	Three TCH from CHEM 1304; BIOL 1401, 1402, GEOL 1301, PHYS 3305	3
Engineering Leadership:	CSE 4360, EMIS 3308, EMIS 3309, ENCE 3302	12
Computer Engineering:	CSE 1341, 2240, 2341, 3353, 3358, 3381, 4344, 4381, 5343, EE 2122, 2322, 2350	33
Tracks:		12
	Hardware: CSE 4386,	
	Three of the following:	
	CSE 5380, 5381, CSE 5385 or EE 5385, CSE 5387	
	Software Engineering: CSE 3345, 4345, 4346,	
	5314 or 5316 or 5319	
	Networking: CSE 4347,	
	Three of the following: 5344, 5348, 5349, EE 5376	
Wellness:		2
Electives:	SoE Advanced Electives	9
		123

Minor in Computer Engineering

A student majoring in Computer Science may not minor in Computer Engineering.

Requirements:

CSE 1341 Principles of Computer Science I
CSE 2240 Assembly Language Programming and Machine Organization
CSE 2341 Principles of Computer Science II
CSE 2353 Discrete Computational Structures
CSE 3381 Digital Logic Design
CSE 3358 Data Structures

The Courses (CSE)

1311. Introduction to Interactive Multimedia. An introduction to multimedia hardware technologies, software systems, and standards used to develop interactive multimedia applications. Topics include screen design, graphics, animation, audio, and still and motion video, as well as compression techniques. Each student will design personal multimedia Web pages that will include one common class theme plus a variety of personally selected subjects. *Prerequisite:* CSE 1305 or permission of instructor.

1319. Introduction to Digital Imaging. Presents an overview of digital imaging in its many varied aspects from the simple to the complex. The hardware reviewed is photographic, video, and scanned conversion mechanisms, and software for editing and converting photographic

and video images is introduced. The science behind the electronic image is discussed in detail. This course resolves the many mystifying technical issues involved in the creation, manipulation, processing and output of digital images through myriad examples, detailed technical information, and practical laboratory assignments. *Prerequisite:* Familiarity with computers. Some programming experience helpful but not required.

1331. Introduction to Web Programming. Examines technologies and techniques for building three-tier Web-based applications. Topics include technologies for developing client-tier graphical user interfaces, server-tier technologies for processing client requests and data-tier database technologies for managing and storing both relational and XML data. Throughout the course issues related to Web security will be studied. All students will participate in team-based collaborative projects.

1340. Introduction to Computing Concepts. Introduction to computer concepts, program structures and interactive application development. Programming with high-level languages, tools, and environments. Laboratory exercises will include programming assignments.

1341. Principles Of Computer Science I. Introduction to the fundamental concepts of computer science—algorithms, program structures, data structures. Structured programming in C++. Development of programming skills to solve problems of reasonable complexity. Introduction to UNIX. First course for CS and CpE majors and minors. *Prerequisite*: A grade of C- or better in CSE 1340 or one course in C, C++ or Java.

2240. Assembly Language Programming and Machine Organization. Computer-related number systems, machine arithmetic, computer instruction set, low-level programming, addressing modes and internal data representation. *Prerequisite:* A grade of C- or better in 1341.

2337. Introduction to Database Design and SQL. Provides practical experience in using SQL and ACCESS 2000. It emphasizes hands-on practical training in implementing and accessing relational databases. No credit for CS and CpE majors or minors. *Prerequisite:* Familiarity with Microsoft Word and Excel packages and both creating and editing files in a Windows environment.

2341. Principles of Computer Science II. Intended as a continuation of CSE 1341; covers object-oriented concepts using the C++ language. Topics include inheritance, templates, polymorphism, exception handling, operator overloading, and File I/O. The course also includes the object-oriented implementation of the basic data structures of linked lists, stacks, queues, sets, and binary trees and their use in efficient program design. A brief introduction to UML is presented; a review of C++ pointers will be given. *Prerequisite:* A grade of C- or better in CSE 1341 or equivalent. [Students who have received a 4 or better on the AP exam in C++ or Java may enroll in this course.]

2353. Discrete Computational Structures. Logic, proofs, partially ordered sets, and algebraic structures. Introduction to graph theory and combinatorics. Applications of these structures to various areas of computer science. *Prerequisite:* A grade of C- or better in both CSE 1341 and MATH 1338.

3342. Programming Languages. Introduction to basic concepts of programming languages, including formal syntax, static and dynamic, scoping, equivalence and consistency of data types, control constructs, encapsulation and abstract data types, storage allocation, and runtime environment. Advanced programming techniques such as tail recursion, inheritance, polymorphism, static and dynamic binding, and exception handling. In-depth studies of representative languages of different programming paradigms — object-oriented, logic, and functional programming. *Prerequisite:* A grade of C- or better in CSE 3358.

3345. Graphical User Interface Design and Implementation. Introduction to the concepts underlying the design and implementation of graphical user interfaces with emphasis on the psychological aspects of human-computer interaction. The course is structured around lectures, case studies and student projects. This course will introduce event-driven programming concepts including the Java API, applications, applets, interfaces, graphics, basic and advanced GUI components, HTML, and multithreading. *Prerequisites:* A grade of C- or better in CSE 2341 or equivalent.

3353. Fundamentals of Algorithms. Introduction to algorithm analysis, big Oh notation, algorithm classification by efficiency. Basic algorithm strategies and basic approaches to problem solving. Algorithms in hard- and software. Sorting and searching algorithms. Algorithms for arithmetic operations. Introduction to graph theory and graph algorithms. *Prerequisites:* A grade of C- or better in CSE 2353 Discrete Structures.

3358. Data Structures. Representation and organization of data for fast access and computation. Consideration of efficient algorithms for storing and retrieving information using lists, trees, hash tables, etc. Dynamic storage allocation/collection techniques. Fast sorting techniques. Abstract data types (ADT). Implementation of data structures. *Prerequisites:* A grade of C- or better in both CSE 2341 and CSE 2353.

3365 (MATH 3315). Introduction to Scientific Computing. Includes techniques for root-finding, interpolation, functional approximation, linear equations, and numerical integration. Special attention is given to C or FORTRAN programming, algorithm implementations, and library codes. *Prerequisites:* A grade of C- or better in both CSE 1341 and MATH 1338. Students registering for this course must register for an associated computer laboratory.

3381. Digital logic Design. Boolean Functions. Logic gates. Memory elements. Synchronous and asynchronous circuits. Shift registers and computers. Logic and control. *Corequisite*: Weekly no-credit lab, *Prerequisite:* A grade of C- or better in CSE 2353 and CSE 2240.

4340 (STAT 4340). Statistical Methods for Engineers and Applied Scientists. Basic concepts of probability and statistics useful in the solution of engineering and applied science problems. Topics: probability, probability distributions, data analysis, sampling distributions, estimations, and simple tests of hypothesis. *Prerequisite:* A grade of C- or better in MATH 1338.

4344. Computer Networks and Distributed Systems. Introduction to network protocols, layered communication architecture, wired and wireless data transmission, data link protocols, network routing, TCP/IP and UDP, e-mail and World Wide Web (www), introduction to distributed computing, mutual exclusion, linearizability, locks, multithreaded computing. *Prerequisites:* A grade of C- or better in both CSE 3358 and CSE 3381.

4345. Software Engineering Principles. Introduction to software system development. Overview of development models and their stages. System feasibility and requirements engineering, architecture and design, validation and verification, maintenance and evolution. Project management. Review of current software engineering literature. Student teams will design and implement small-scale software systems. Class presentations. The course contains a major design experience. *Prerequisites:* A grade of C- or better in CSE 3358 and senior standing.

4346. Software Engineering Design Project. Project course, with a major design component. Students participate in a multidisciplinary group project team. There will be topical discussions in relationship with the project, which include software development life cycle, project team organization, project planning and scheduling, management, testing and validation methods, industrial standards and interfaces, and the importance of life long learning. The group project will provide the major design experience for students in the Computer Science program and the Software Engineering track of the Computer Engineering program. *Prerequisites:* A grade of C- or better in 4345

4347. Networks Design Project. Project course, with a major design component. Students participate in a multidisciplinary group project team. There will be topical discussions in relationship with the project, which include network protocols, layered communication architecture, data communication, data link protocols, internetworking, routing, congestion control, industrial standards and interfaces, and the importance of life long learning. The group project will provide the major design experience for students in the Networks track of the Computer Engineering program. *Prerequisites:* A grade of C- or better in CSE 4344.

4360. Technical Entrepreneurship. Demonstrates the concepts involved in the management and evolution of rapidly growing technical endeavors. Students are expected to participate in active learning by doing, making mistakes and developing solutions, and observing mistakes and approaches made by the other teams. *Prerequisites:* Junior or Senior standing or graduate student.

4381. Digital Computer Design. Machine organization, instruction set architecture design, memory design, control design: hardwired control and microprogrammed control, algorithms for computer arithmetic, microprocessors, and pipelining. *Prerequisite:* A grade of C- or better in CSE 3381.

4386. Hardware Design Project. Project course, with a major design component. Students participate in a multidisciplinary group project team. There will be topical discussions in relationship with the project, which include the hardware design and manufacturing process, hardware description languages, modular design principles, quantitative analysis, industrial standards and interfaces, and the importance of life long learning. The group project will provide the major design experience for students in the Hardware track of the Computer Engineering program. *Prerequisite:* C- or better in CSE 4381.

4(1-4)9(0-4). Undergraduate Project. An opportunity for the advanced undergraduate student to undertake independent investigation, design, or development. Variable credit from one to four term hours. Written permission of the supervising faculty member is required before registration.

5314. Software Testing and Quality Assurance. The relationship of software testing to quality is examined with an emphasis on testing techniques and the role of testing in the validation of system requirements. Topics include module and unit testing, integration, code inspection, peer reviews, verification and validation, statistical testing methods, preventing and detecting errors, selecting and implementing project metrics, and defining test plans and strategies that map to system requirements. Testing principles, formal models of testing, performance monitoring, and measurement also are examined. *Prerequisite:* It is strongly recommended that students have software engineering experience in industry. C- or better in all previous CSE courses and senior standing.

5316 Software Requirements. Focuses on defining and specifying software requirements that can be used as the basis for designing and testing software. Topics include use-cases for describing system behavior, formal methods, specifying functional vs. nonfunctional requirements and the relationship of requirements to software testing. *Prerequisite:* C- or better in all previous CSE courses and senior standing.

5319 Software Architecture And Design. Software development requires both an understanding of software design principles and a broader understanding of software architectures that provide a framework for design. The course explores the role of design in the software lifecycle including different approaches to design, design tradeoffs and the use of design patterns in modeling object-oriented solutions. It also focuses on important aspects of a system's architecture including the division of functions among system modules, synchronization, asynchronous and synchronous messaging, interfaces, and the representation of shared information. *Prerequisite:* C- or better in all previous CSE courses and senior standing.

5320. Artificial Intelligence. Introduction to basic principles and current research topics in artificial intelligence. Formal representation of real-world problems, search of problem spaces for solutions, and deduction of knowledge in terms of predicate logic, nonmonotonic reasoning, and fuzzy sets. Application of these methods to important areas of artificial intelligence, including expert systems, planning, language understanding, machine learning, neural networks, computer vision, and robotics. *Prerequisites:* A grade of C- or better in both CSE 3342 and CSE 3358.

5330. File Organization and Database Management. A survey of current database approaches and systems, principles of design and use of these systems. Query language design, implementation constraints. Applications of large databases. Includes a survey of file structures and access techniques. Use of a relational DBMS to implement a database design project. *Prerequisite:* A grade of C- or better in CSE 3358.

5339. Computer System Security. Investigates a broad selection of contemporary issues in computer security, including an assessment of state-of-the-art technology used to address security problems. Specific topics include: sources for computer security threats and appropriate reactions, basic encryption and decryption, secure encryption systems, program security,

trusted operating systems, database security, network and distributed systems security, administering security, legal and ethical issues. *Prerequisite:* A grade of C- or better in CSE 5343.

5341. Compiler Construction. Review of programming language structures, loading, execution, and storage allocation. Compilation of simple expressions and statements. Organization of a compiler including compile-time and run-time symbol tables, lexical analysis, syntax analysis, code generation, error diagnostics, and simple code optimization techniques. Use of a recursive high-level language to implement a complete compiler. *Prerequisites:* A grade of C- or better in both CSE 3342, and CSE 3358.

5342. Concepts of Language Theory and Their Applications. Formal languages and their relation to automata. Introduction to finite state automata, context-free languages, and Turing machines. Theoretical capabilities of each model, and applications in terms of grammars, parsing, and operational semantics. Decidable and undecidable problems about computation. *Prerequisite:* A grade of C- or better in CSE 3342 or permission of instructor.

5343. Operating Systems and System Software. Theoretical and practical aspects of operating systems: overview of system software, timesharing and multiprogramming operating systems, network operating systems and the Internet, virtual memory management, interprocess communication and synchronization, file organization, and case studies. *Prerequisites:* A grade of C- or better in both CSE 2240 and CSE 3358.

5344. Computer Networks and Distributed Systems II. Introduction to network protocols, layered communication architecture, multimedia applications and protocols, Quality of Service (QoS), Congestion control, optical networks, DWDM, network survivability and provisioning, wireless networks. There will be an interdisciplinary project requiring the use of currently available network design and simulation tools. *Prerequisite: A grade of C- or better in* CSE 4344.

5345. Advanced Java Programming. Provides the student with a foundation for building advanced distributed and embedded systems applications in Java through the use of Java's support for networking and concurrency. Topics will include exception handling, object serialization, thread and thread-safe programming issues, component frameworks, remote method invocation, security, and concurrency issues. Discussion of the issues and techniques necessary to develop high-performance, object-oriented concurrent Java applications and be able to apply advanced Java constructs to research projects in telecommunications, databases, networks, and mobile computing. *Prerequisites* CSE 3345 or consent of instructor.

5346. Java Distributed Enterprise Computing. Familiarizes students with issues and techniques surrounding the building of distributed enterprise Java applications. Initial focus will be on exceptions, threads, streams, and sockets in support of building Java-based web servers. Building on these basic constructs, the course will explore details of enterprise technology including Java Servlets, Java Server pages (JSP), database connectivity (JDBC), Enterprise Java Beans and J2EE for building tightly-coupled server components. *Prerequisite:* CSE 5345 or equivalent.

5347. XML and the Enterprise. XML, the Extensible Markup Language, is widely used to define vocabularies for a wide range of applications including software configuration, data exchange, and web-based protocols. This course provides a detailed examination of XML as an enterprise technology. Focuses on APIs, interfaces and standards that are driving this technology including: DTDs and XML Schema to structure SML data; XSLT to transform XML; XML protocols for distributed computing and XML security initiatives. Students will come away with broad understanding of XML and the technical issues and tradeoffs among different alternatives for processing XML. *Prerequisite:* An understanding of object-oriented concepts; familiarity with Java and/or C++.

5348. Internetworking Protocols and Programming. Processing and Interprocess Communications (IPC), UNIX domain sockets, fundamentals of TCP/IP, Internet domain sockets, packet routing and filtering and firewall, SNMP and network management, client-server model and software design, Remote Procedure Call (XDR, RPC, DCE), design of servers and clients, networking protocols for the World Wide Web, internetworking over new networking tech-

nologies. *Prerequisites:* A grade of C- or better in both CSE 4344 and CSE 5343, and C programming.

5349. Data and Network Security. Covers conventional as well as state-of-the-art methods in achieving data and network security. Private key and public key encryption approaches will be discussed in detail with coverage on popular algorithms such as DES, Blowfish, and RSA. In the network security area, the course will cover authentication protocols, IP security, Web security and system level security. *Prerequisite*: C- or better in CSE 4344.

5350. Algorithm Engineering. Algorithm design techniques. Methods for evaluating algorithm efficiency. Data structure specification and implementation. Applications to fundamental computational problems in sorting and selection, graphs and networks, scheduling and combinatorial optimization, computational geometry, arithmetic, and matrix computation. Introduction to parallel algorithms. Introduction to computational complexity and a survey of NP-complete problems. Developing student facility to design efficient algorithms is emphasized. *Prerequisite:* A grade of C- or better in both CSE 3358 and CSE 3353.

5359. Software Security. As software is delivered across networks and web-based environments, security is critical to successful software deployment. This course focuses on software security issues that pertain to the network Application Layer in the classic OSI model. At the application network layer, issues related to encryption, validation, and authentication are handled programmatically rather that at the network level. Students will work with APIs for cryptography, digital signatures and third party certificate authorities. The course will also explore issues related to XML and Web Services security by examining standards and technologies for securing data and programs across collaborative networks. *Prerequisite:* Programming experience in Java and/or C++.

5376 (EE 5301). Introduction to Telecommunications. Overview of public and private telecommunications systems, traffic engineering, switching, transmission, and signaling. Channel capacity, media characteristics, Fourier analysis and harmonics, modulation, electromagnetic wave propagation and antennae, modems, and interfaces, and digital transmission systems. T1 carriers, digital microwave, satellites, fiber optics and SONET, and Integrated Services Digital Networks.

5380. VLSI Algorithms. Introduction into problems, algorithms, and optimization techniques used in the design of high-performance VLSI design. Emphasis on algorithms for partitioning, placement, floor planning, wire routing, and layout compaction. Additional focus on constraints for the design for field programmable gate arrays (FPGA's) throughout the course. *Prerequisites*: C- or better in CSE 3381 and C- or better in CSE 3358.

5381. Computer Architecture I. Introduces students to the state of the art in uniprocessor computer architecture. The focus is on the quantitative analysis and cost-performance tradeoffs in instruction-set, pipeline, and memory design. Topics covered: quantitative analysis of performance and hardware costs, formal specification, instruction set design, pipeline, delayed branch, memory organization, and advanced instruction-level parallelism. *Prerequisites: files*, two-dimensional and three-dimensional transformations, clipping and windowing, perspective, hidden line elimination and shaping, interactive graphics, and applications. *Prerequisite:* A grade of C- or better in CSE 3358.

5385. Microprocessor Architecture and Interfacing. Emphasizes the design and interfacing of microprocessor computer systems. Topics covered: processor architecture and interfacing, memory structure and interfacing, bus systems, support chips, tools for hardware design, analysis, simulation, implementation, and debugging. The theoretical part of the course is complemented by a laboratory in which students get practical experience in designing and analyzing interfaces to processors, memories, and peripherals. *Prerequisites:* A grade of C- or better in CSE 3381 or a grade of C- or better in both EE 2381 and CSE 2240.

5387. Digital Logic Design II. Modern topics in digital systems design including the use of HDLs for circuit specification and automated synthesis tools for realization. Programmable logic devices are emphasized and used throughout the course. This course has heavy laboratory assignment content and a design project. *Prerequisite:* C- or better in CSE 3381 Digital Logic Design.

ELECTRICAL ENGINEERING

Professor Panos E. Papamichalis, **Chair**

Professors: Jerome K. Butler, Gary A. Evans, W. Milton Gosney, Alireza Khotanzad, Geoffrey Orsak, Panos E. Papamichalis, Behrouz Peikari, Mandyam D. Srinath; **Associate Professors:** Thomas Chen, Carlos E. Davila, Scott C. Douglas, James G. Dunham, Choon S. Lee, Sukumaran Nair, Mitchell A. Thornton; **Assistant Professors:** Marc P. Christensen, Dinesh Rajan; **Adjunct Professors:** Steven Gray, Richard Levine, P.K. Rajasekaran; **Adjunct Associate Professors:** Hossam H'mimy, Clark Kinnaird, Bernard Ku, John D. Provence, Roshan Sharma; **Adjunct Assistant Professors:** Eric Bird, Cheng-Chung Chen, Girish Patel, Leo R. Pucacco, Gordon Sohl; **Emeritus Professors:** Kenneth L. Ashley, Robert R. Fossum, Someshwar C. Gupta, Kenneth W. Heizer, Lorn L. Howard, John A. Savage; **Senior Lecturer:** H. Charles Baker.

The discipline of electrical engineering is at the core of today's technology-driven society. Personal computers, computer-communications networks, integrated circuits, optical technologies, digital signal processors, and wireless communications systems have revolutionized the way we live and work, and extraordinary advances in these fields are announced every day. Because today's society truly is a technological one, a degree in electrical engineering offers exceptional opportunities for financial security, personal satisfaction, and expanding the frontiers of technology.

The Department of Electrical Engineering at SMU offers a full complement of courses at the Bachelor's degree level in communications, information technology, networks, digital signal processing, optoelectronics, electromagnetics, microelectronics, and systems and control.

The mission of the department is to offer a value-added educational experience through quality instruction and scholarly research with an entrepreneurial spirit that prepares graduates for the full range of career opportunities in today's high technology marketplace.

The goals of the department are:

- To become a leading electrical engineering department in the nation by building peaks of excellence in the fields of communications/signal processing and micro/optoelectronics and by being a leader in innovative educational programs.
- To design undergraduate curricula that will allow graduates to choose careers in engineering or engineering management, or to pursue graduate degrees in engineering, business, medicine, or law.
- To offer world-class Ph.D. programs that prepare graduates for academic careers, for research careers in the high technology industry, or for technical entrepreneurship.
- To be a leader in graduate lifelong learning, developing and offering innovative courses and programs for the working professional and the practicing engineer.

The educational objectives of the department are:

1. Graduates will be successful in understanding, formulating, analyzing, and solving a variety of electrical engineering problems.
2. Graduates will be successful in designing a variety of engineering systems, products, or experiments.
3. Graduates will be successful in careers in engineering or management, or in achieving graduate degrees in engineering, business, medicine, or law.
4. Graduates will assume leadership and entrepreneurial positions.
5. Graduates will successfully function and communicate effectively, both individually and in multidisciplinary teams, in culturally diverse and dynamic technical environments.
6. Graduates will continue to develop a broad education with exposure to contemporary issues and professional ethics, laying a foundation for lifelong learning.

The Electrical Engineering Department is engaged in an ongoing assessment process that evaluates the success in meeting these objectives and enhances the development of the program.

In addition to the B.S.E.E. degree, a professionally oriented Bachelor's degree in telecommunications systems is offered through the Electrical Engineering Department. The courses in this curriculum provide an overview of the telecommunications industry and prepare the student to become immediately involved in the development of new telecommunications products, services, and applications.

The SMU Electrical Engineering Department emphasizes the following major areas of interest:

1. *Biomedical Engineering* – Overview of biomedical engineering, biomedical devices and instrumentation, biomedical signal capture, processing and modeling.
2. *Communications and Information Technology* – Detection and estimation theory, digital communications, computer networks, spread spectrum, cellular communications, coding, encryption, compression, and wireless and optical communications.
3. *Control Systems* – Linear and nonlinear systems control, robotics, and computer and robot vision.
4. *Digital Signal Processing* – Digital filter design, system identification, spectral estimation, adaptive filters, neural networks, and DSP implementations.
5. *Image Processing and Computer Vision* – Digital image processing, computer vision, and pattern recognition.
6. *Lasers, Optoelectronics, Electromagnetic Theory and Microwave Electronics* – Classical optics, fiber optics, laser recording, integrated optics, dielectric wave guides, antennas, transmission lines, laser diodes and signal processors, and superconductive microwave and optoelectronic devices.
7. *Solid State Circuits, Computer Aided Circuit Design, and VLSI Design* – Electronic circuits, computer-aided design, VLSI design, and memory interfaces.
8. *Electronic Materials and Solid State Devices* – Fabrication and characterization of devices and materials, device physics, noise in solid state devices, infrared detectors, AlGaAs and GaAs devices and materials, thin films, superconductivity, superconductive devices and electronics, hybrid superconductor-semiconductor devices, ultrafast electronics, and applications of Scanning Tunneling microscope.
9. *Telecommunications* – Overview of modern telecommunications components and systems, data communications, digital telephony, and digital switching.

Department Facilities

The department has access to the School of Engineering academic computing resources, consisting of shared-use computer servers and desktop client systems connected to a network backbone. All of the servers in the School of Engineering are running some variant of UNIX or Microsoft Windows. There is one primary file server that holds 356 GB of data and exports files using FNS or CIFS protocols. Each user, whether faculty, staff, or student, has a "home" directory on the central file server. This directory is exported to other servers or desktop computers, regardless of operating systems, as needed. There are over forty servers whose purposes include the following: file service, UNIX mail, Exchange mail, firewall, UNIX authentication, NT authentication, printer management, lab image download, classroom-specific software, X windows service, news, domain name service, computational resources, and general use. This allows the files to be used as a resource in both the UNIX and Microsoft PC environments. Almost all computing equipment within

the School of Engineering is connected to the Engineering network at 100 megabits and higher. The network backbone is running at a gigabit per second over fiber. Most servers and all engineering buildings are connected to this gigabit backbone network. The backbone within Engineering is connected to both the Internet 2 and the campus network that is then connected to the Internet at large. In addition to servers and shared computational resources, the School of Engineering maintains a number of individual computing laboratories associated with the departments.

Specific department laboratory facilities for instruction and research include:

Antenna Laboratory. The antenna lab consists of two facilities for fabrication and testing. Most of the antennas fabricated at the SMU antenna lab are microstrip antennas. Small and less complex antennas are made with a T-Tech milling machine and an etching method (to be installed soon) is used to make more complex and large antennas. Fabricated antennas are characterized with an HP 5810B network analyzer. Workstations are available for antenna design and theoretical computation. Radiation characteristics are measured at the anechoic chamber at the University of Texas at Arlington under a contractual agreement.

Biomedical Engineering Laboratory. This laboratory contains instrumentation for carrying out research in electrophysiology, psychophysics, and medical ultrasound. Four Grass physiographs permit the measurement of electroencephalograms as well as visual and auditory evoked brain potentials. The lab also contains a state-of-the-art dual Perkinje eye tracker and image stabilizer made by Fourward Technologies, Inc., a Vision Research Graphics 21" Digital Multisync Monitor for displaying visual stimuli, and a Cambridge Research Systems visual stimulus generator capable of generating a variety of stimuli for use in psychophysical and electrophysiological experiments. Ultrasound data can also measured with a Physical Acoustics apparatus consisting of a water tank, RF pulser/receiver and RF data acquisition system. Several PC's are also available for instrumentation control and data acquisition.

Digital Signal Processing Laboratory. Digital signal processors (DSPs) are programmable semiconductor devices that are used extensively in cellular telephones, high-density disk drives, and high-speed modems. Courses in this laboratory focus on programming the Texas Instruments TMS320C50, a fixed-point processor, with emphasis on assembly language programming. Topics include implementation of FIR and IIR filters, the FFT, and a real-time spectrum analyzer.

Networks Laboratory. The Networks Laboratory provides the opportunity to simulate and evaluate different network configurations from local area networks to the Internet. High-end PCs are configured with OPNET and other simulation software to model telecommunications networks and study their performance. Currently the Networking Lab consists of a group of 8 PCs. A proposal is under development currently to establish a Linux cluster of PCs for distributed computing. A new software tool for general modeling and analysis of network traffic will be developed for analyzing traffic statistics, model fitting, and statistical testing. The project will involve the purchase of four PCs dedicated to the research effort. The Networks Laboratory is also used for instruction in conjunction with several networking courses offered in the department.

Multimedia Systems Laboratory. This facility includes an acoustic chamber with adjoining recording studio to allow high-quality sound recordings to be made. The chamber is sound-isolating with double- or triple-wall sheet rock on all four sides as well as an isolating ceiling barrier above the drop ceiling. The walls of the

chamber have been constructed to be nonparallel to avoid flutter echo and dominant frequency modes. Acoustic paneling on the walls of the chamber are removable and allow the acoustic reverberation time to be adjusted to simulate different room acoustics. The control room next to the acoustic chamber includes a large 4-foot-by-8-foot acoustic window and inert acoustic door facing the acoustic chamber. Up to sixteen channels of audio can be carried in or out of the chamber to the control room. Experiments to be conducted in the Multimedia Systems Laboratory include blind source separation, deconvolution and dereverberation. Several of the undergraduate courses in Electrical Engineering use sound and music to motivate system-level design and signal processing applications. The Multimedia Systems Laboratory will be used in these activities to develop data sets for use in classroom experiments and laboratory projects for students to complete.

High-speed Wireless Communications Laboratory. The laboratory provides a multitier network testbed for research purposes and also serves as a facility for conducting lab courses on wireless communications and networking. The infrastructure in the lab will include: a) GSM based cellular network that provides wide range connectivity at medium data rates, b) 802.11 based WLAN offering high data rates in an office environment, and c) Bluetooth networks that offers low cost, short range, and low data rate connections. One of the research focus areas is on investigating total power efficiency of these heterogeneous networks.

Semiconductor Processing Clean Room. The 2,800 square-foot, class 10,000 clean room, consisting of a 2,400 square-foot, class 10,000 room and a class 1,000 lithography area of 400 square feet, is located in the Jerry R. Junkins Engineering Building. A partial list of equipment in this laboratory includes acid and solvent hoods, photoresist spinners, a scanning electron microsope, two contact mask aligners, a thermal evaporator, a plasma asher, a plasma etcher, a turbo-pumped methane hydrogen reactive ion etcher and ion beam etch system, a four-target sputtering system, a plasma-enhanced chemical vapor deposition reactor, a diffusion-pumped four pocket e-beam evaporator, an ellipsometer, and several profilometers. Other equipment includes a boron-trichloride reactive ion etcher, a chemical-assisted ion-beam etcher, and an e-beam evaporator for dielectric deposition. The clean room is capable of processing silicon and compound semiconductors for microelectronic, photonic, nanotechnology devices.

Submicron Grating Laboratory. This is dedicated to holographic grating fabrication and has the capability of sub tenth-micron lines and spaces. Equipment in this laboratory includes a floating air table, an argon ion laser (ultraviolet lines) and an Atomic Force Microscope. This laboratory is used to make photonic devices with periodic features such as distributed feedback, distributed Bragg reflector, grating-outcoupled and photonic crystal semiconductor lasers.

Photonic Devices Laboratory. This laboratory is dedicated to characterizing the optical and electrical properties of photonic devices. Equipment in this laboratory program includes optical spectrum analyzer, an optical multimeter, visible and infrared cameras, an automated laser characterization system for edge-emitting lasers, a manual probe test system for surface-emitting lasers, a manual probe test system for edge-emitting laser die and bars, and a near- and far-field measurement system. An optical fiber test bed for measuring eye diagrams and BER at data rates up to 2.5 Gbps and associated optical test equipment will be added if space becomes available.

Photonics Simulation Laboratory. This laboratory has specific computer programs that

have been developed and continue to be developed for modeling and designing semiconductor lasers and optical waveguides, couplers and switches. These programs include WAVEGUIDE (calculates near-field, far-field, and effective indices of dielectric waveguides and semiconductor lasers with up to 500 layers. Each layer can contain gain or loss), GAIN (calculates the gain as a function of energy, carrier density and current density for strained and unstrained quantum wells for a variety of material systems), GRATING (uses the Floquet Bloch approach and the boundary element method to calculate reflection, transmission and outcoupling of dielectric waveguides and laser structures with any number of layers), and FIBER (calculates the fields, effective index, group velocity and dispersion for fibers with a circularly symmetric index of refraction profiles). Additional software is under development to model the modulation characteristics of photonic devices.

Photonic Architectures Laboratory. This laboratory is in the process of being set up. When complete, it will have a fully equipped opto-mechanical and electrical prototyping facility, supporting the activities of faculty and graduate students in experimental and analytical tasks. The lab is ideally suited for the packaging, integration, and testing of devices, modules, and prototypes of optical systems. It will have two large vibration isolated tables, a variety of visible and infrared lasers, single element 1-D and 2-D detector arrays and a large compliment of optical and opto-mechanical components and mounting devices. In addition, the laboratory will have extensive data acquisition and analysis equipment, including a 1394 (Firewire) capable image capture and processing workstation, specifically designed to evaluate the electrical and optical characteristics of smart pixel devices and FSOI modules. Support electronics hardware includes various test instrumentation, such as arbitrary waveform generators and a variety of CAD tools for optical and electronic design.

CURRICULUM IN ELECTRICAL ENGINEERING

The undergraduate curriculum in electrical engineering provides the student with basic principles through required courses, and specialization through a guided choice of elective courses.

Areas of Specialization

Due to the extensive latitude in course selection and to the wide variety of courses available within the Department of Electrical Engineering and within the University as a whole, it is possible for the electrical engineering student to concentrate his or her studies in a specific professional area. The areas available include the following:

- Control Systems
- Biomedical Engineering
- Communications
- Computer Engineering
- Digital Signal Processing
- Electromagnetics and Optics
- Electronic Circuits
- Electronic Devices and Materials
- Networks
- Systems
- Telecommunications Engineering

In most cases, the concentration is satisfied by systematically taking a specified group of electrical engineering courses at the advanced level. However, the telecommunications engineering, computer engineering, and biomedical options are more specialized. Their requirements are described later.

Bachelor of Science in Electrical Engineering

The electrical engineering curriculum is administered by the Department of Electrical Engineering and is accredited by the Accreditation Board of Engineering and Technology (ABET).

The term credit hours within this curriculum are distributed as follows:

		TCH
College Requirements:	ENGL 1301, 1302, Perspectives including ECO 1311, Cultural Formations, and Wellness	23
Mathematics:	MATH 1337, 1338, 2339, 2343, and a three-hour elective course at the 3000 or above level	15
Science:	CHEM 1303 or 1305; PHYS 1303, 1304, and 1105; and a three-hour elective in physics or chemistry	13
Computer Science:	CSE 1341 and one of CSE 2340, 2341, or 2353	6
Engineering Leadership:	Two of EMIS 3308, ENCE 3302, EMIS 3309 or CSE 4360	6
Engineering Elective:	One of ME 2310, 2320, 2331, 2342, CSE 2340, 2341, 2353, EMIS 2360, EE 3311, 3315, 3330, 3372 or 3373	3
Core Electrical Engineering:	EE 1382, 2122, 2170, 2181, 2322, 2350, 2370, 2381 and 3360	21
Junior Electrical Engineering Electives:	EE 3122, 3181, 3322, 3381 and four of 3311, 3315 3330, 3372, or 3373	20
Advanced Electrical Engineering Electives		12
Electrical Engineering Senior Design Sequence:	EE 4311 and 4312	6
Minimum total hours required		125

Three hours of advanced electrical engineering electives must be selected in each of the three areas listed below:

EE 4372, 4373, 5360, 5362, 5370, 5371, 5372, 5373, 5374, 5375; and 5376
EE 5356, 5357, 5380, 5381, and 5385;
EE 5310, 5312, 5314, 5321, 5330, 5332, and 5333.

The remaining three hours of advanced electrical engineering electives may be chosen from any of the above three areas, the telecommunications courses offered by the EE Department, or advanced (5000-level) CSE courses offered by the CSE Department. Please note that EE 8000-level courses are primarily for graduate students but may be taken by highly qualified undergraduates with the approval of the adviser and the instructor. Special topics courses also are available.

Each student is expected to complete and file a plan of study with his or her academic adviser. The plan should state specific choices to meet the foregoing requirements and develop an area of specialization when this is desired. This should be done as soon as possible; however, for many students, it is a process that continues from term to term as the individual becomes better acquainted with the discipline of electrical engineering and with the choices available.

Specializations are offered in four important areas: premedical or biomedical engineering, computer engineering, a dual degree in physics, and telecommunications engineering. Each student may select one of these specializations or may personalize his or her degree by a particular choice of advanced major electives.

Bachelor of Science in Electrical Engineering
(Biomedical Engineering Specialization)

The Department of Electrical Engineering offers a B.S.E.E. degree with a specialization in biomedical engineering. This program enables students to satisfy requirements for admission to medical school, and it is carried out in cooperation with the Baylor University Medical Center in Dallas. Students may also work on projects under faculty supervision at the University of Texas Southwestern Medical School.

The term credit hours within this curriculum are distributed as follows:

		TCH
College Requirements:	ENGL 1301, 1302, Perspectives including ECO 1311, Cultural Formations, and Wellness	23
Mathematics:	MATH 1337, 1338, 2339, 2343, and a three-hour elective course at the 3000 level or above	15
Science:	BIOL 1401, 1402, 3304, and 3306; CHEM 1303, 1304, 1113, 1114, 3117, 3118, 3371, and 3372; and PHYS 1303 and 1304*	36
Computer Science:	CSE 1341	3
Core Electrical Engineering:	EE 1382, 2181, 2381, 2350, 2170, 2370, 2122, 2322, 3181, 3360 and 3381	25
Engineering Leadership:	One of EMIS 3308, EMIS 3309, ENCE 3302 or CSE 4360	3
Junior Electrical Engineering:	EE 3372 and two of 3311, 3315, 3322, 3330, 3373	9
Advanced Electrical Engineering Elective		3
Biomedical Engineering:	EE 5340 and 5345	6
Electrical Engineering Senior Design Sequence:	EE 4311, 4312	6
Minimum total hours required		129

Bachelor of Science in Electrical Engineering
(Computer Engineering Specialization)

The Department of Electrical Engineering offers a B.S.E.E. degree with a computer engineering specialization, which brings together aspects of electrical engineering and computer science with the aim of developing state-of-the-art digital computer systems. Students in the Computer Engineering specialization receive training in a variety of areas ranging from C programming, assembly language, and data structures, to logic design, microprocessor interfacing, and computer architecture.

The term credit hours within this curriculum are distributed as follows:

		TCH
College Requirements:	ENGL 1301, 1302, Perspectives including ECO 1311, Cultural Formations, and Wellness	23
Mathematics:	MATH 1337, 1338, 2339, 2343, and one of MATH 3315/CSE 3365, MATH 3337 or 3353	15

* Students who plan to attend medical school are recommended to also take PHYS 1105 and 1106.

		TCH
Science:	CHEM 1303 or 1305, PHYS 1303, 1304, 1105 and a three-hour elective in physics or chemistry	13
Computer Science:	CSE 1341, 2341, 2353, and 3358	12
Engineering Leadership:	Two of EMIS 3308, ENCE 3302, EMIS 3309, or CSE 4360	6
Core Electrical Engineering:	EE 1382, 2122, 2170, 2181, 2322, 2350, 2370, 2381 and 3360	21
Junior Electrical Engineering Electives:	EE 3122, 3181, 3322, 3381 and three of 3311, 3315, 3330, 3372, or 3373	17
Advanced Electrical Engineering Electives:	EE 5381, 5385 and two of 5357, 5380 or CSE 5343	12
Senior Design Sequence:	EE 4311 and 4312	6
Minimum total hours required		125

Bachelor of Science in Electrical Engineering and Bachelor of Science With a Major in Physics

The Electrical Engineering Department and the Physics Department offer an integrated curriculum that enables a student to obtain both a Bachelor of Science in Electrical Engineering (B.S.E.E.) degree and a Bachelor of Science (B.S.) degree with a major in Physics.

The term credit hours within this curriculum are distributed as follows:

		TCH
College Requirements:	ENGL 1301, 1302, Perspectives including ECO 1311, Cultural Formations, and Wellness	23
Mathematics:	MATH 1337, 1338, 2339, 2343, and a three-hour elective course at the 3000 level or above	15
Science:	CHEM 1303 or 1305; PHYS 1105, 1303, 1304, 3305, 3344, 3345, 4211, 5337, 5382, and 5383; and PHYS 3374 or ME 3341	33
Computer Science:	CSE 1341	3
Engineering Leadership:	Two of EMIS 3308, ENCE 3302, EMIS 3309 or CSE 4360	6
Core Electrical Engineering:	EE 1382, 2122, 2170, 2181, 2322, 2350, 2370, 2381 and 3360	21
Junior Electrical	EE 3122, 3181, 3322, 3381, either 3330 or PHYS 4392; and two of EE 3311, 3315 or 3372	17
Advanced Electrical Engineering Electives		12
Senior Design Sequence:	EE 4311 and 4312	6
Minimum total hours required		136

Bachelor of Science in Electrical Engineering
(Communication and Signal Processing Specialization)

Signal processing, in particular digital signal processing (DSP), has come to play a significant role in our daily lives. Literally, DSP involves the processing of various signals such as speech, music, video, and others in digital form. Such processing is usually done with a digital signal processor, a programmable semiconductor device designed to rapidly process digital data. The DSP is an integral component of any system in which information is processed or transmitted, whether over a conventional telephone network, a cellular phone, or the Internet.

The explosive growth of the telecommunications industry and the Internet has generated a tremendous demand for electrical engineers who are versed in the language of DSP. The Communication and Signal Processing specialization is designed to meet this need. Students learn the fundamental principles of DSP during the first year. Concepts and techniques in signal processing and communications are covered in greater depth in each successive year, culminating in a senior-year capstone course in which students design and develop signal processing algorithms and software for a communications system application.

The term credit hours within this curriculum are distributed as follows:

		TCH
College Requirements:	ENGL 1301, 1302, Perspectives including ECO 1311, Cultural Formations, and Wellness	23
Mathematics:	MATH 1337, 1338, 2339, 2343, and a three-hour elective course at the 3000 level or above	15
Science:	CHEM 1303 or 1305; PHYS 1303, 1304, and 1105 and a three-hour elective course at the 3000 level	13
Computer Science:	CSE 1341, 2341, and 2353 and one of CSE 2340 or 3358	12
Engineering Leadership:	Two of EMIS 3308, EMIS 3309, ENCE 3302, or CSE 4360	6
Core Electrical Engineering:	EE 1382, 2181, 2381, 2350, 2170, 2370, 2122, 2322, 3330, 3360, 3372, and 3373	30
Junior Electives	Two of EE 3311, 3315, 3322 or 3381/3181	6/7
Advanced Communication and Signal Processing Courses:	EE 4173, 4372, 4373, 5176, 5373, and 5376	14
Electrical Engineering Senior Design Sequence:	EE 4311, 4312	6
Minimum total hours required		125/126

Bachelor of Science in Electrical Engineering
(Telecommunications Specialization)

Telecommunications includes any type of communication of information at a distance by electronic means. This communication may be between humans, machines, businesses, government entities, computers, or any combination thereof. Example information formats include speech and audio, computer data, facsimile, imaging and video, wire and cable, radio, satellite, Internet, microwave, optical fiber, and others.

Today's intelligent networks, created by imbedding computers in telecommunications systems, have given rise to an information society. Corporations, institutions, and government agencies cannot operate effectively in a competitive world without using telecommunications systems efficiently to communicate that information.

All areas of the telecommunications profession need telecommunications engineers. In manufacturing, they work as creators and designers of products. In the service category, they create efficient and cost-effective systems for telephone service providers, Internet and online computer services, and cellular service providers. At the corporate-user end of the profession, they ensure that their companies have the very best telecommunications systems to give their businesses a competitive edge.

Telecommunications engineers face challenges requiring specialized training in electrical engineering, plus breadth that include regulatory law, economics, management science, and computer science. To ensure their success, SMU candidates for the degree of Bachelor of Science in Electrical Engineering with a telecommunications engineering specialization are grounded in all of these areas. To accomplish this within the context of a four-year program, students take a uniquely formulated curriculum of electrical engineering and telecommunications courses, plus specially selected courses relating to the multiple disciplines mentioned above. In this way, graduates are prepared to face information-age challenges and opportunities, whether in a corporate, institutional, or government environment.

SMU's long historic relationship with local industry provides a wealth of educational opportunities for students in terms of design projects, laboratories, field trips, and, at the student's option, cooperative education. SMU's Bachelor of Science in Electrical Engineering program with a telecommunications engineering specialization prepares students for careers with a large variety of producers, service providers, and users of telecommunications systems. Graduates of the program should have little difficulty finding employment in the immediate Dallas area or elsewhere.

This 124-term-credit-hour program has several distinctive features:

- Early development of research skills using computers and the Internet, allowing students to use these important tools throughout their college experience.
- Participation in student teams that work on a variety of industry-sponsored real-world laboratory projects under the joint guidance of faculty and industry representatives.
- Option of entering the Cooperative Education Program as explained in the Cooperative Education section to get more than a year of industry experience and income before graduation.

The term credit hours within this curriculum are distributed as follows:

		TCH
College Requirements:	ENGL 1301, 1302, Perspectives including ECO 1311, Cultural Formations, and Wellness	23
Mathematics:	MATH 1337, 1338, 2339, 2343, and 3308	15
Science:	CHEM 1303 or 1305; PHYS 1303, 1304, and 1105 and a three-hour elective in physics or chemistry	13
Computer Science:	CSE 1341, 2341	6
Engineering Leadership:	Two of EMIS 3308, EMIS 3309, ENCE 3302, or CSE 4360	6
Electrical Engineering:	EE 1382, 2181, 2381, 2350, 2170, 2370, 2122, 2322, 3330, 3360, 3122, 3181, 3322, 3372 and 3381	35

		TCH
Junior Elective	One of EE 3311, 3315, 3373	3
Advanced Electrical Engineering:	EE 5370 and one of EE 4372, 4373, 5332, 5373, or 5381	6
Telecommunications:	EE 5301 and 5302	6
Advanced Electives:	Six hours of advanced electrical engineering or telecommunications engineering electives approved by adviser	6
Senior Design Sequence:	EE 4311 and 4312	6
Minimum total hours required		125

Bachelor of Science In Electrical Engineering
(Microelectronics and Photonics Specialization)

Microelectronics and Photonics represent the foundation of electrical engineering upon which modern society with its vast spectrum of electronic systems and instrumentation has been built. The microelectronics and photonics specialization develops a fundamental understanding of the principles of electronic and photonic devices and systems. Almost all modern machinery has a significant part of its functionality based in electronic and optical components. The microelectronics revolution of the ’60s saw transistors combined into integrated circuits through the vision of Nobel Laureate Jack Kilby of Texas Instruments, invented here in Dallas. The evolution in integrated circuits has resulted in millions of transistors being put to work in a space about the size of a fingernail producing powerful and affordable computers and other conveniences that have fueled the economy and revolutionized human life. The evolution in microelectronics promises to continue at a rapid pace to produce faster, more functional, and cheaper electronics. Mechanical machines are being fabricated with electronic devices in integrated circuits referred to as microelectromechanical systems. Photonics involves the processing and movement of information with light. Fiber optic communications is dominating high volume communications. At present, individual photonic devices such as lasers are starting to be combined into “integrated” optical devices and circuits much like Jack Kilby combined transistors to form integrated microelectronic and photonic devices and systems upon which students can build their careers. With this knowledge, an imaginative mind could also change the world.

The term credit hours within this curriculum are distributed as follows:

		TCH
College Requirements:	ENGL 1301, 1302, Perspectives including ECO 1311, Cultural Formations, and Wellness	23
Mathematics:	MATH 1337, 1338, 2339, 2343, and one of MATH 3308 MATH 3315/CSE 3365, MATH 3337 and MATH 3353	15
Science:	CHEM 1303, PHYS 1303, 1304, 1105 or 1106 and one of CHEM 1304, PHYS 3305, 4392, 5337, 5380 and 5382	13
Engineering Leadership:	Two of EMIS 3308, EMIS 3309, ENCE 3302, or CSE 4360	6
Engineering Electives:	CSE 1341, and one of CSE 2340, 2341, or 2353; ME 2310 2320, 2331, 2342, 2351; EMIS 2360	9

		TCH
Core Electrical Engineering:	EE 1382, 2122, 2170, 2181, 2322, 2350, 2370, 2381 and 3360	21
Junior Electrical Engineering:	EE 3122, 3181, 3311, 3315, 3322, 3330, 3381, and 3372	20
Advanced Electrical Engineering:	EE 5310, 5312 and two of EE 5314, 5321, 5330, 5332, 5333 or PHYS 5382	12
Senior Design Sequence:	EE 4311 and 4312	6
Minimum total hours required		125

Bachelor of Science in Electrical Engineering
(Engineering Leadership Specialization)

This specialization prepares graduates to be highly educated engineers with the appropriate interdisciplinary knowledge to assume important management and leadership positions and to become technical entrepreneurs in a globally competitive world.

The term credit hours within this curriculum are distributed as follows:

		TCH
College Requirements:	ENGL 1301, 1302, Perspectives including ECO 1311, Cultural Formations, and Wellness	23
Mathematics:	MATH 1337, 1338, 2339, 2343, and a three-hour elective course at the 3000 or above level	15
Science:	CHEM 1303 or 1305; PHYS 1303, 1304, and 1105; and a three-hour elective in physics or chemistry	13
Computer Science:	CSE 1341 and one of CSE 2340, 2341, or 2353	6
Engineering Leadership:	EMIS 3308, ENCE 3302, EMIS 3309 and CSE 4360	12
Engineering Elective:	One of ME 2310, 2320, 2331, 2342, CSE 2340, 2341, 2351, EMIS 2360, EE 3311, 3315, 3330, 3372 or 3373	3
Core Electrical Engineering:	EE 1382, 2122, 2170, 2181, 2322, 2350, 2370, 2381 and 3360	21
Junior Electrical Engineering Electives:	EE 3122, 3181, 3322, 3381 and two of 3311, 3315, 3330, 3372, or 3373	14
Advanced Electrical Engineering Electives		12
Electrical Engineering Senior Design Sequence:	EE 4311 and 4312	6
Minimum total hours required		125

Three hours of advanced electrical engineering electives must be selected in each of the three areas listed below:

EE 4372, 4373, 5360, 5362, 5370, 5371, 5372, 5373, 5374, 5375; and 5376
EE 5356, 5357, 5380, 5381, and 5385;
EE 5310, 5312, 5314, 5321, 5330, 5332, and 5333.