

3.6.1

Educational Programs: Graduate/Post-Baccalaureate:Post-baccalaureate program rigor

The institution's post-baccalaureate professional degree programs, master's and doctoral degree programs, are progressively more advanced in academic content than its undergraduate programs.

Judgment

Compliance Partial Compliance Non-Compliance Not Applicable

Narrative

Tennessee Technological University (TTU) has established guidelines and policies that ensure its graduate degree programs are more complex, more rigorous, more distinct, and more challenging than the undergraduate degree programs. TTU established the Graduate Studies Executive Committee (GSEC) to be responsible for making policy and reviewing proposed policy changes governing all facets of graduate studies. These policies are published in the Graduate Catalog [1], which is available online and is searchable by college, keyword, or subject. TTU Policy 272 [2a] describes the role of the GSEC and its procedures [2b].

Faculty Credentials

All appointments to membership on the graduate faculty are made by the Provost based upon recommendations submitted by department chairpersons with qualification endorsement from the dean of the college, and the dean of the Graduate College. Eligibility criteria, responsibilities, and terms are defined in the Graduate Catalog [3]. For example, a full graduate faculty member is required to hold an earned doctorate or equivalent terminal degree in an appropriate discipline from an appropriately accredited institution; achieved an appropriate level of scholarship or creative activity and erudition characterized by peer-reviewed publications, conference publications, recitals, exhibitions, externally funded research grants; demonstrated (by institutional involvement) commitment to the academic community, the University, his or her students, and academic discipline; and criteria for reappointment are based on evidence of continued pattern of scholarly or creative activity of the quality expected for initial membership. Responsibilities for a full graduate faculty member include: may serve as a student's academic advisor for the Doctor of Philosophy degree; and may teach graduate courses for master's, specialist, and doctoral degrees. The term of membership is six years for a full graduate faculty member. The College of Graduate Studies provides oversight in verifying that appointed and qualified graduate faculty teach graduate courses.

Admissions Requirements

Graduate Admissions requirements have been established for each graduate degree program to ensure that students have the academic background and abilities needed to succeed in a rigorous master's, specialist, or doctoral academic degree program. Admissions requirements are defined at both the university and the college level. Each application received into the Graduate College will be supported by official transcripts of undergraduate and graduate credit from accredited institutions, letters of recommendations (if required by the major department), college test scores (GRE, GMAT, MAT) as determined by the major department, and other materials as required by the major department. The College of Graduate Studies requires graduate entrance exam test scores demonstrating more advanced content than undergraduate programs. Detailed admissions requirements are found on departmental websites that demonstrate appropriateness for the degrees offered. These requirements are summarized in the Graduate Admissions Overview [4] and the table below. General requirements are listed in the Graduate Catalog [5a] and in TTU Policy 270 [5b].

Table 1. Graduate Degree Programs and Corresponding Degrees.

Degree Programs	Graduate Degree
PSM	Environmental Informatics [6]
PSM	Manufacturing Sustainability [7]
MA	English [8]
MA; EdS	Curriculum and Instruction(including new concentrations in STEM Education and Library Science) [9][10]
MA; EdS	Educational Psychology and Counselor Education [11]
MA	Exercise Science, Physical Education and Wellness(Distance program only) [12]
MA; EdS	Instructional Leadership [13][14]
MEd	Advanced Studies in Teaching and Learning [15]
MPS	Professional Studies with concentrations in Healthcare Administration, Human Resources Leadership, Strategic Leadership, and Training and Development [16]
MBA	Business Administration [17]
MS	Biology [18]
MS	Chemistry [19]
MS	Mathematics [20]
MS	Engineering [21]
MS	Chemical Engineering [22]
MS	Civil and Environmental Engineering [23]
MS	Computer Science [24]
MS	Electrical and Computer Engineering [25]
MS	Mechanical Engineering [26]
MSN	Nursing [27]
PhD	Exceptional Learning [28]
PhD	Engineering [29]
PhD	Environmental Sciences [30]

The Graduate Catalog provides definitions as to admissions classifications including full standing, provisional standing, and special standing [31]. The Graduate College oversees the admissions process to ensure that students meet the requirements for admission, and that provisional admission deficiencies are removed prior to a student moving through the program. This oversight process ensures integrity in the admissions process and contributes to student success.

In addition to admissions integrity, program continuance is also a function of the Graduate College [32]. Students are required to maintain a 3.0 GPA while enrolled in the graduate program, and students are to follow a predefined program of study. The Graduate College monitors each student to ensure that all

degree program requirements are met and maintained during the students' enrollment.

Evidence of Advanced Content in Post-Baccalaureate Programs

TTU's post-baccalaureate master's, specialist, and doctoral degree programs are academically more advanced than TTU's undergraduate programs. The GSEC is responsible for setting policies and procedures that govern University graduate degree programs, and acts as an advisory body to the President of the University on matters relating to the interpretation of Graduate Studies regulations and on matters of general policy in the operation of the College of Graduate Studies. The Graduate College communicates policies concerning graduate programs to the academic units. In addition, the Graduate College ensures that any action taken by the GSEC is in accordance with the general regulations of the University and its governing board.

As a centralized administrative unit of the University, the Graduate College provides oversight to degree-granting academic units to ensure that graduate students follow a program of study that lists all course requirements as defined by their department as partial fulfillment of their graduate degree [33]. The program of study is then reviewed and approved by the College of Graduate Studies to ensure adherence to the degree requirements set forth in TTU Policy 271 [34] and listed in the Graduate Catalog [35].

Content and Rigor – Post-Baccalaureate

Post-baccalaureate degree programs are structured such that graduates from the three degree programs (master's, specialist, and doctoral) are able to demonstrate the mastery of the discipline. The content and rigor of each of the programs within the three degree types are purposefully developed by faculty experts to be more rigorous and in-depth than undergraduate degrees. The course content and degree requirements differ at each level and in each program. Many master's degrees are thesis-based, requiring the graduate student to conduct in-depth analysis of a specific topic and then to defend such research to a committee of graduate faculty. Non-thesis master's degrees require more coursework than thesis degrees and often culminate in a capstone course or project and a comprehensive exam. The College of Education awards the Specialist degree upon completion of the master's degree and 30 additional semester hours of specialized coursework, three hours of laboratory and/or field experience, and three hours of an advanced research project.

An example of a Graduate College policy that demonstrates advanced rigor for post-baccalaureate programs includes the comprehensive exam [36]. At or near the completion of the course requirements for the graduate degree, each candidate must pass a comprehensive examination conducted by the candidate's graduate advisory committee. In the examination the student should demonstrate the breadth of knowledge in the discipline, depth in specific areas, and the ability to integrate knowledge and skills gained in the program. For example, MBA, MPS, and MSN candidates have culminating projects that serve as the comprehensive exam. In other programs such as the MA programs in Curriculum and Instruction and the MA in Counseling and Educational Psychology, students complete both a problem paper and a written comprehensive exam. For thesis track master's students, the formal defense of the thesis serves as the comprehensive exam. For doctoral students, a written comprehensive exam is administered upon completion of 80% of the degree in order for students to be admitted to candidacy and a formal defense of the research and dissertation are required as well.

Content and Rigor – Doctoral

The doctoral degree in Environmental Sciences [37] requires at least 61 semester credits of coursework beyond the undergraduate degree; the doctoral degree in Exceptional Learning [38] requires at least 78 semester credit hours; and the doctoral degree in Engineering [39] requires at least 72 semester credit hours beyond the undergraduate degree. Each of the doctoral programs at TTU has a coursework requirement, doctoral seminar requirement, research component, dissertation requirement, and residency requirement built in to the student's program of study. The rigorous doctoral programs at TTU include an in-depth program of research methodology, statistical research methods, and a scientific and/or scholarly research project. All doctoral degrees require the successful completion of comprehensive qualifying exams (verbal and written) and a formal research defense. A dissertation,

which makes a scientific and/or scholarly contribution to the literature, must be submitted and approved by the Graduate College prior to award of the degree.

Course Content at Each Graduate Level by Major Program Area

To illustrate a case for compliance for course content rigor, an analysis of the differences of course content at each of the three graduate levels is provided in the table below. Examples of Fall 2014 course syllabi by major program area are included in the table along with the course description, prerequisite requirement (if applicable) and elements that demonstrate a case for graduate course content rigor. For the purposes of this comparison, general elements that reflect a rigorous graduate program include advanced content, advanced theoretical exploration, literature reviews, project papers and experiments, research projects, mastery of content, oral reports, and expression of critical opinions. It is also important to note that expert faculty members will also include topics to be covered and required knowledge needed to study the advanced topic. Course content information that was used to provide this summary was extracted from the Compliance Assist Course Directory Database.

Table 2. Graduate Course Content.

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
COBA	MBA	MACT	ACCT 6620	<p>Auditing and Attestation. Purpose: To advance the study of generally accepted auditing standards (GAAS) in the United States with an emphasis on financial statement audit theory and practice.</p> <p>Course Objectives: Students satisfactorily completing this course will be able to:</p> <ol style="list-style-type: none"> 1. Demonstrate mastery of concepts, standards, and practices which are necessary for successful completion of the Auditing and Attestation section of the CPA Exam, 2. Research relevant authoritative sources to solve and report on contemporary problems in audit practice, and 3. Identify and report on current issues in the accounting profession. <p>Course Components/Content: The course consists of two components.</p> <p>(1) A professional literature review addressing auditing standards and practices related to engagement planning, internal control, forming a conclusion, engagement review, and required communications. (2) Research and current issues projects (RCIP).</p>	<ol style="list-style-type: none"> 1. Mastery of concepts 2. Conducts research 3. Conducts literature review 4. Research Project
CAS	MS	Biology	BIOL 6630	<p>Animal Ecology: COURSE DESCRIPTION: The relationship between animals and their environment.</p>	<ol style="list-style-type: none"> 1. Study of advanced topics 2. Mastery of subject

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
				<p>COURSE OBJECTIVES: This course has been designed to familiarize students with basic and advanced topics concerning behavioral adaptations of animals, especially as influenced by evolutionary principles.</p> <p>TENTATIVE LIST OF TOPICS TO BE COVERED: Basic Evolutionary Concepts, Speciation and the Species Concept, Optimality Theory, Reproductive Ecology, Social Biology</p>	3. Literature review
CAS	MS	Chemistry	CHEM 6110	<p>Advanced Inorganic Chemistry: Course Description: The correlation of the physical and chemical properties of inorganic compounds with their structure. Prerequisite: CHEM 4110(5110). Course Objectives: in-class worksheets, presentations of assigned materials and final exam. Topics to be covered: Ziegler-natta catalysts; zeise's salt; borazine components; the wacker process; vaska's compound; Wilkinson's catalyst; the Fischer tropisch process; rhodium catalyzed oxo process; Knowle's asymmetric catalytic synthesis of L-dopa; metal N₂ complexes; cis-platin; zinc fingers; metal carbenes; semiconductors; superconductors; interstitial alloys; ferritin; heme groups; haber process</p>	1. Advanced study of topics 2. Literature review 3. Research
CAS	MA	English	ENGL 6590	<p>Seminar in 19th Century American Literature: Course emphasis: examination of representative fiction of Irving, Poe, and Hawthorne in the context of mid-nineteenth century in America and noting how each of these writers played a pivotal role in the</p>	1. Oral reports 2. Critical opinions 3. Annotated Bibliography 4. 10 sources 5. Research paper

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
				development of American Fiction.	
CAS	MS	Math	MATH 6540	<p>Calculus of Variations & Applications: This course is designed to provide for the graduate student in mathematics, science, or engineering an introduction into the ideas and techniques of the calculus of variations. The applications of the calculus of variations in several fields outside the realm of pure mathematics is also illustrated.</p> <p>Topics: Elements of theory; further generalizations; general variation of a functional; the second variation; sufficient conditions for a weak extremum; fields; sufficient conditions for a strong extremum; direct methods of calculus of variations.</p>	<ol style="list-style-type: none"> 1.Exploration of mathematical theory 2.Advanced content 3.Application of theory to several fields of study
COEd	MA	C&I	READ 6600	<p>Literature Across the Curriculum Description: Uses of literature in English/language arts, science, social studies, math, and other curricular areas. Equal emphasis on enhancement of content areas and integration across content areas.</p> <p>Master Students: Read five research-based, peer-reviewed articles concerning the use of literature across the curriculum and present the review orally.</p> <p>EDS and Doctoral Students: Research an issue about using literature across the curriculum using at least six current research-based peer reviewed sources. Present findings to class in 15 minute presentation. (Notice difference in content for doctoral students.)</p>	<ol style="list-style-type: none"> 1.Conducts research 2.Theoretical and knowledge bases of reading 3.Applying theory 4.Literature review
COEd	MA	EXPW	EXPW 6750	Design and Management of Leisure and Sport	<ol style="list-style-type: none"> 1.Literature review

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
				<p>Facilities: Description: This course covers issues from construction-related concerns to marketing facilities, naming rights, and concession concerns. Also covers facility management, paid back-hour operations such as water, heating, cooling, and related activities. Focus is on applied knowledge.</p>	<p>2. Content Project 3.Thesis critique 4.Application of content</p>
COEd	MA EdS	INSL	INSL 6560	<p>Technology for Administrators Course involves a survey of emerging and existing technologies related to school administration, instruction, and planning. Emphasis is placed on effective knowledge, access, and use of available technology with the ability to accurately retrieve, analyze, and disseminate school-related data.</p>	<p>1.Research paper 2.Technology plan 3.Collaborative grant project 4.Critical reflection 5.Content area of NETS standards</p>
COEd	EdS	INSL	INSL 7530	<p>Assessment & Evaluation: Improvement in Teaching: Description: Current trends in curriculum development; defining objectives; planning for improvement; organization of instructional materials; curriculum evaluation. Advanced study of innovations, recent trends, research findings, and evaluation relating to the improvement of teaching. Purpose: This course is intended to enable candidates to use assessment and evaluation as tools to identify, discuss, and analyze current status of curriculum deliver, instructional methods, materials, outcomes; as a means of planning for continuous improvement of student achievement.</p> <p>Note: Advanced 7000 content level</p>	<p>1.Apply content through field experience 2.Conduct statistical analysis using SPSS 3.Conduct literature review 4.Develop research skills</p>
COEd	MA	EDPY	EDPY	Interpreting and Applying	1.Acquire

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
	EdS		6930	<p>Psychological Research: In Interpreting and Applying Psychological Research, students will be asked to evaluate and synthesize peer-reviewed literature within the scope of professional issues and problems. Involved in this process is the ability to find and evaluate good sources of information. Students will learn to read and critique peer reviewed journal articles for content and methodology. Students will use problem solving and planning models to facilitate problem identification and evaluation. Students will synthesize information from multiple journal articles to create a focused problem paper that encompasses a specific issue within a professional field.</p>	<p>knowledge to evaluate methodology and content. 2. Complete a problem paper 3. Conduct research 4. Literature review 5. Increase knowledge of statistical methods</p>
COEd	EdS	EDPY	EDPY 7200	<p>Advanced Educational Psychology: This course focuses on how basic psychological principles influence educational settings. Student will be given opportunities to apply the course knowledge. Understand basic facts, principles, methods and theories of psychology. Apply knowledge to school guidance, counseling, psychology, praxis and DOE standards. Note: Advanced 7000 level content</p>	<p>1. Understand issues affecting content area. 2. Lead class discussion. 3. Synthesize class material and apply knowledge 4. Apply to TN DOE PE and School Counseling standards</p>
COEd	PhD	EDU	EDU 7420	<p>Quantitative Methods I: Introductory educational statistics and foundations of measurement. Prerequisite: Admission to doctoral program and introductory course in statistics. Objectives: Graduate students will be able to: Appreciate and advocate for the importance of the correct use of statistics,</p>	<p>1. Increase knowledge in content area 2. Apply content to educational research 3. Develop a research project incorporating statistics and measurement.</p>

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
				<p>measurement, & assessment in education; Describe data with descriptive statistics (e.g. means, standard deviation), tables, graphs, and displays ; Use the normal curve as a model for expressing student performance within a group, for comparison of groups, and to explain probabilities; Use various kinds of sampling, sampling theory, central limit theorem, hypothesis testing, and confidence intervals as applied to real education problems; Apply methodology to the solution of educational research and measurement problems ; Apply correlation and regression methodology to aid the understanding of relationships between variables in educational settings; Choose and apply statistical techniques for the various methods of establishing the reliability and validity of assessment measures used in education; Choose and apply various test improvement strategies such as the calculation of item difficulty, of item discrimination, of distractor functioning, and the process of norming a test; Apply and make decisions utilizing the concepts of power and effect size, and type I and type II errors; Understand and correctly apply parametric tests (t tests, one way, and multi-way analysis of variance), and non-parametric statistical tests; Plan an appropriate research study which involves data collection</p> <p style="text-align: center;">Note: Advanced 7000 level content</p>	
COEng	PhD	Eng	ECE 7730	Advanced Wireless Communications Systems: Course Description: Course	1.Requires foundational knowledge and

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
				<p>Introduction to the advanced topics in wireless communications. Survey the latest developments in the field.</p> <p>This course is designed for doctoral graduates. At this point, students already have solid backgrounds on random variables and basic wireless techniques. Towards their doctoral dissertations, such an advanced course on wireless communications can be justified. First, they need to build upon their skills towards understanding current journal papers in the field. There is a big gap between their skills and the mathematical skills required in the papers. Second, the field has exploded in the last two decades. They must be pointed at the right sources to start with their journey. Third, we select several advanced topics to cover in depth, these including 5G, massive MIMO, millimeter-wave communications, random matrices, and big data methods.</p> <p>Prerequisite: ECE6750 or consent of the instructor.</p> <p>Prerequisites by Topic:</p> <ul style="list-style-type: none"> • Random Variable and Processes • Basic Modulation and Coding • Matrix Theory • Fading channel • MIMO, OFDM <p>Note: Advanced 7000 level content</p>	<p>builds upon that knowledge</p> <ol style="list-style-type: none"> 2.Literature review 3.Research techniques
COEng	MS	CEE	CEE6300	<p>Multi-Scale Analysis of Concrete</p> <p>Course Objectives: To present students with a comprehensive overview of basic principles relating to portland cement and concrete including microstructural development during</p>	<ol style="list-style-type: none"> 1.Integrate research with learning 2.Course project 3.Hands-on laboratory experiences

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
				hydration, mineral and chemical admixtures, fresh and hardened properties, durability, and special applications for concrete. To improve critical assessment; To improve written and oral technical communication skills; To integrate research and learning.	
COEng	MS	ME	ME 7510	<p>Space Mechanisms:</p> <p>Course Description: The class will be tailored to the research of each student. The following subjects may be covered.</p> <ol style="list-style-type: none"> 1. Spherical trigonometry 2. Analysis and synthesis of spherical mechanisms 3. Mobility of mechanisms 4. Dual numbers, dual vectors, screw calculus, quaternions, dual quaternions 5. Kinematic analysis of space linkages and manipulators 6. Synthesis of space mechanisms 7. Curvature theory of point, line, and plane trajectories 	<ol style="list-style-type: none"> 1. Advanced content in kinematics 2. Theoretical exploration of content 3. Projects 4. Research reports 5. Presentations
COEng	MS	ECE	ECE 7600	<p>Power System Control:</p> <p>Prerequisites: ECE 6600 or ECE 6670 or equivalent courses & ECE 6200 or equivalent courses.</p> <p>Prerequisites by topics are: Power flow analysis; Electrical machines; Control systems</p> <p>Course Description: This course is devoted to dynamic modeling, analysis, and control of multi-machine power systems.</p> <p>Course objectives: Students who successfully complete this course should be able: To develop Differential Algebraic Equations (DAEs) for mathematical modeling of multi-machine power systems with various types of load (dynamic, algebraic, etc.), various renewable energy</p>	<ol style="list-style-type: none"> 1. Advanced content 2. Literature review 3. Research 4. Project design

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
				sources (wind, solar, etc.) and various FACTS-controllers (STATCOM, UPFC, etc.);To simulate the above DAEs in MATLAB environment; To design different control loops in power systems including Automatic Voltage Regulator (AVR), Turbine-Governor control, Automatic Load Frequency Control (ALFC), and Power System Stabilizer (PSS).	
COEng	MS	CSC	CSC 7210	Anomaly and Intrusion Detection Systems: Course Description: This course covers traditional anomaly and intrusion detection systems, as well as current advances in this ever-growing field. The application of anomaly detection to a wide-range of domains, including fraud, insider threats, and time-series data will be investigated in-depth, as well as network attacks and the systems for detecting oddities such as network intrusions and denial of service attacks. This course will not only cover the subjects through discussion and readings, but also through hands-on experience.	1.Advanced content 2.Hands-on experience 3. Projects
COEng	MS	ChemE	CHE 7230	Advanced Nanocomposite Engineering Technology: Prerequisite: CHE6010 Course Description: Nanoscience requires application of both continuum mechanics and quantum mechanics to aid materials design. The course will reflect interdisciplinary studies in composite engineering and chemistry to illuminate advanced principles of mechanics, characterization and thermodynamics in the emerging field of nanoscience/surface science. Modeling methodologies, scaling and modern	1.Projects 2.Advanced content 3.Literature review

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
				processing techniques are taught.	
IDS	MEd	ASTL	ASTL 6709	Action Research: Course Description: Must be taken during the final semester of the program. Will empower classroom teachers to construct their own knowledge and to make it available to others for the benefit of all learners. This course is designed to help educators and other professionals understand the relationship between their own professional development and the process of improving the quality of pupils' and/or colleagues' learning.	1.Advanced content 2.Literature review 3. Project work
IDS	MPS	PRST	PRST 6040	Human Resources Management: Course Description: Analysis of theories, policies, procedures, practices and regulations relevant to attracting, retaining and directing a competent work force. Analysis of the basic personnel function with emphasis on the fact that all managers are "personnel managers." Integration of scientific theory, procedures, instruments, and federal regulations into personnel selections, placement, and security programs.	1.Advanced theoretical content 2.Project work 3.Content Research
IDS	PSM	ESS	ESS 6510	Programming GIS: Course Description: Applications of Python scripting to automate processes in ArcMap and Model Builder. The course will introduce basic Python programming, including input, output, variables, looping, creating scripts using IDLE, running scripting using IDLE and Arcpy, cursor functions, and customization of the toolbox. Course Objectives: The objectives of this course are	1.Advanced GIS content 2.Advanced programming content

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
				<p>three-folded: 1) introduce students to the world of automation in GIS 2) prepare students for advanced GIS skills. Programming GIS skills are in high demand in current GIS professional field. Students with such skills become very marketable and 3) Have students master the interfaces between Arcpy, Python, Model Builder and toolbox.</p> <p>Learning Objectives: Students are learning the most advanced skills in GIS in this course. Students will be able to customize interface, working on modeling skills and creating modules for solving real-world problems by using Python programming. The course helps students step into the programming and automation field. Students are expected to know how to think critically and logically to use resources, existing scripts, and examples from the classes to solve problems normally taking many tedious and repeatedly steps to complete.</p> <p>Prerequisite Knowledge: Students are expected to have GIS experiences/background and basic computer skills to learn the best. Accessing GIS software and downloaded IDLE Python scripting language are the required computing environment for this course.</p>	
IDS	PhD	ENVS	EVS 7900	<p>Scientific Writing and Grantsmanship: Course Description: The primary goal is to help students improve their writing skills and to develop competitive proposals for funding. Specific objectives include:</p>	<ol style="list-style-type: none"> 1.Advanced content 2.Advanced skill building 3.Research proposal 4.Proposal development

College	Degree	Major	Course	Syllabi Content Extracted from https://tntech.compliance-assist.com	Elements Demonstrate
				<p>1. To write clear and concise abstracts 2. To write clear manuscripts of the students' research results 3. To write competitive grant proposals 4. To learn how to comply with proposal timelines and page limits 5. To learn how to provide peer review of manuscripts and proposals</p> <p>Major Topics Covered:</p> <ol style="list-style-type: none"> 1. Basic grammar 2. Scientific abbreviations 3. Editing draft manuscripts 4. Proposal development, including budget development 5. Funding sources and requests for proposals 6. Reviewing manuscripts and proposals <p>Measurable Outcomes: <i>Students will be expected to:</i></p> <ol style="list-style-type: none"> 1. Improve their writing skills from the beginning to the end of the semester 2. Edit various drafts of other students' work 3. Produce a solid research proposal or journal article by the end of the semester 	
Nurs	MSN	Nurs	NURS 6201	<p>Theories of Nursing Education: Prerequisite: NURS 6000</p> <p>Course Description: This course explores major research-based theories of Adult learning and knowledge development in nursing. These theories will be examined for their utility across a variety of settings/and or levels of education.</p>	<ol style="list-style-type: none"> 1. Advanced content 2. Advanced theoretical perspectives 3. Literature review. 4. Project paper

Course Progression and Prerequisites

Graduate courses are designed to be progressively more advanced than their prerequisites. For example, the ECE 7260 H-Infinity Control course requires ECE 6230, MATH 6010, and MATH 6020. The ECE 7620 Adjustable Speed Drives course requires ECE 6620 and ECE 6650.

As graduate students progress through the graduate degree program, they build upon their knowledge level and take progressively more rigorous and advanced coursework in their subject area. The students' programs of study outline the course advancement and progression plan that ensures they successfully complete foundational and pre-conditional course content as they progress through their studies. TTU has designed the prerequisite course plan to ensure that students gain the knowledge, skills, and abilities needed to be successful in their coursework. Prerequisite coursework is established for each student in his or her program of study that defines what courses are essential before progression to the next level of coursework may be made.

Graduate courses that are taken by students near the end of their program of study are designed to be progressively more advanced than their prerequisites (moving from 5000 and 6000 level to 7000 level). For example, the electrical engineering course, ECE 7600 Power System Control, requires ECE 6200 and ECE 6600 or ECE 6670. The two prerequisites defined by the faculty graduate committee and the advisor and included in the student's program of study ensure that the student meets the essential power control requirements needed to complete the analysis inherent in the ECE 7600 course. Also note that the electrical engineering course numbering plan for this example moved from the 6000 level to the 7000 level as the course content moved from graduate level to advanced graduate level. Another example includes the CHE 7230 Advanced Nanocomposite Engineering Technology course which requires CHE 6010. Expert graduate faculty members determine the prerequisite requirements in each program at TTU. In the table listed above, courses that require a level of knowledge to participate in the course include the required course number and in many instances, will also provide the prerequisite topics that must be understood (see ECE 7600 above). The inclusion of prerequisites by topic is an important part of creating an awareness of the progressive nature of coursework at the graduate level.

Another example of the progressive nature of the course sequencing is EDU 7420 Quantitative Inquiry I, an advanced statistics course that leads to a subsequent research design class, EDU 7430. Both EDU 7420 and EDU 7430 prepare graduate students in the Exceptional Learning doctoral program to understand, analyze, and apply statistical research methods. The courses provide the foundational understanding and skills necessary to design a research study. Series of courses such as these are the building blocks to engage and advance students to a point where meaningful theories, applications, research, and skills may be achieved in the higher-level graduate classes. In the course catalog descriptions, doctoral level courses also include the prerequisite "admission to doctoral program." A complete listing of the graduate courses and their prerequisites may be found in the online Graduate Catalog [40a] [40b].

Degree Program Requirements

The TTU Graduate Catalog provides detailed degree requirements for the master's, specialist, and doctoral degree programs offered by the University. Included in the degree requirements are definitions of the time limitation of the degree (six years for a master's and specialist degree and eight years for a doctoral degree), course validation, quality of work, advisory committee, program of study, transfer credit, admission to candidacy requirements, comprehensive exam, thesis/dissertation defense, and application for graduation [5a]. As evidenced by the above requirements, graduate level degree requirements are more advanced than those at the undergraduate level.

Course Numbering System

The Graduate School Executive Committee also sets clear guidelines in administering its graduate curriculum, which is offered through the Colleges of Arts and Sciences, Business, Education, Engineering, Interdisciplinary Studies, and the School of Nursing. Courses numbered 0800s through 4000s are for undergraduate students and increase in rigor as the numbers ascend. Graduate courses are numbered 5000 through 7990 and increase in rigor as well [41]. See table below for the TTU approved course numbering policy:

Table 3. Course Numbering Policy.

Course Numbering Policy	Description
0800-4990	Undergraduate Level
5000-5990	Graduate Level
6000-6990	Graduate Level
7000-7990	Advanced Graduate Level

Although graduate-level classes are primarily for graduate students, undergraduates may enroll in 4000/5000 level classes and earn graduate or undergraduate credit depending on their needs and with permission of the College of Graduate Studies and the student’s academic or faculty advisor. A course taken at the undergraduate 4000 level, however, may not be taken later at the 5000 level without special permission from the departmental chairperson, college dean, and the Associate Dean of the College of Graduate Studies. Also, courses listed as 4000/5000 may be taken only at the 5000 level for graduate credit. To ensure that these courses are sufficiently challenging, the faculty facilitate additional assignments for those students taking the course for graduate credit. An outline of this extra work required must be included in the course description approved by the Graduate Studies Executive Committee. The faculty must be aware of which undergraduate students are seeking graduate credit by checking class rolls and must also make sure that they have met appropriate prerequisites for those courses.

Program Development and Approval Process

Quality control of curriculum development and changes occurs at three levels within the University for both undergraduate and graduate curricula. Undergraduate proposals originate within departments and pass through their respective college curriculum committees, which are comprised of individuals representing each department in that college. A college committee may approve or reject a proposal based on its merits. If rejected, a proposal is returned to its department for further consideration. When approved at the college level, a proposal is subjected to final scrutiny by the University Curriculum Committee, which is comprised of chairs from each department in the University.

Graduate proposals follow a similar pathway in that they originate from individual departments and pass through a college’s curriculum committee. However, these proposals must also go to the Graduate Studies Executive Committee. The Graduate Studies Executive Committee is comprised of 23 members from the faculty, various administrators, and four graduate students from departments and colleges that offer graduate degrees. These persons are invited by the President to serve on the committee usually for a two-year term. The Graduate Studies Executive Committee ensures that coursework for each graduate degree level is progressively more advanced than undergraduate coursework and appropriate to the degree level for which it is designated.






Once approved by the respective committees, proposals must be submitted to the Academic Council and then to the Provost and Vice President for Academic Affairs. The Provost's office then sends proposals to the TBR for staff approval and notification [42].

Conclusion

The graduate degree programs at TTU are rigorous, and the content is progressively more advanced at each degree level. The curriculum is current and reviewed regularly by the faculty of the department offering the degree. The College of Graduate Studies oversees the graduate program, and student learning assessment data are used to improve existing programs and develop new programs. In addition, data are used to sustain program rigor and remain current with the latest advances in the discipline. The policies, processes, procedures, and practices implemented at TTU effectively contribute to meeting Comprehensive Standard 3.6.1.

Sources

-  [01] 2014-2015 Graduate Catalog
-  [02a] TTU Policy 272
-  [02b] Graduate School Executive Committee Procedures
-  [03] Faculty Credentials
-  [04] Graduate Admissions Requirements by Program_Major
-  [05a] Graduate Catalog_Admission
-  [05b] TTU Policy 270
-  [06] PSM Environmental Informatics
-  [07] PSM Manufacturing Sustainability
-  [08] MA English
-  [09] MA Curriculum and Instruction
-  [10] EdS Curriculum and Instruction
-  [11] MA EdS Counseling and Psychology
-  [12] MA Exercise Science, Physical Education and Wellness
-  [13] MA Instructional Leadership
-  [14] EdS Instructional Leadership
-  [15] MEd Advanced Studies in Teaching and Learning
-  [16] MPS Professional Studies
-  [17] MBA Business
-  [18] MS Biology
-  [19] MS Chemistry
-  [20] MS Mathematics
-  [21] MS Engineering
-  [22] MS Chemical Engineering
-  [23] MS Civil and Environmental Engineering
-  [24] MS Computer Science
-  [25] MS Electrical and Computer Engineering
-  [26] MS Mechanical Engineering
-  [27] MSN Nursing
-  [28] PhD Exceptional Learning
-  [29] PhD Engineering
-  [30] PhD Environmental Sciences
-  [31] Admission Classifications

-  [32] Program Continuance
-  [33] Sample Program of Study
-  [34] TTU Policy 271
-  [35] Degree Requirements
-  [36] Comprehensive Examination Requirements
-  [37] Environmental Sciences PhD
-  [38] Exceptional Learning PhD
-  [39] Engineering PhD
-  [39] Graduate Catalog Courses
-  [40a] Graduate Catalog Courses
-  [40b] Examples of Course Description
-  [41] Graduate Course Numbering
-  [42] New Programs and Program Modifications