The Teaching, Learning and Technology (TLT) program offers six master's degrees and one graduate certificate, divided into two areas: teacher education and instructional technology. The program also offers a doctoral degree.

The master's degrees in teacher education are Master of Education in Elementary Education and PreK-4 Teacher Certification, Master of Education (or Master of Arts) in Secondary Education and Teacher Certification, and Master of Education (or Master of Arts) in Teaching and Learning. Undergraduate students at Lehigh may also enroll in a five-year program for a Master of Education in Elementary Education and PreK-4 Certification or Master of Education in Secondary Education and Teacher Certification, in addition to their undergraduate degree. Teacher education students may elect to extend their coursework to earn additional certification in Special Education. All teacher certification programs have been approved by the Pennsylvania Department of Education, making graduates eligible for initial certification in Pennsylvania.

In instructional technology TLT offers a Master of Science in Instructional Technology and a Lehigh graduate certificate in Technology Use in the Schools. This certificate is endorsed by the International Society for Technology in Education (ISTE).

Finally, the program offers a Doctor of Philosophy in Technology, Learning, and Technology, which spans both fields of teacher education and instructional technology.

The TLT program prepares professional educators through a combination of graduate-level education and certification experiences. The program highlights research-based, inquiry-oriented, and technology-enabled strategies to reach all learners. We emphasize collaborative and equitable approaches to instruction and learning. TLT graduates are not only highly skilled practitioners, but also reflective scholars and leaders in their professional communities.

Upon completion, TLT graduates become teachers in PreK-12 schools; curriculum coordinators, coaches, and educational technology specialists in both formal and informal education settings; instructional designers and/or learning designers; or professors in higher education institutions.

For more information about teacher education:
http://coe.lehigh.edu/academics/disciplines/teachered

For more information about instructional technology:
http://coe.lehigh.edu/academics/disciplines/tech

Professor. Alec M. Bodzin, PhD (North Carolina State University)

Associate Professors: Helen Lynn Columba-Piervello, EDD (University of Louisville); Thomas Chalmers Hammond, PhD (University of Virginia); Brook Sawyer, PhD (University of Virginia)

Assistant Professor. Sara Kangas, PHD (Temple University)

Professor Of Practice. Farah L. Vallera, PhD (Lehigh University)

Emeriti. Ward M. Cates, EDD (Duke University); Scott Roy Garrigan, EDD (Lehigh University); Warren R. Heydenberk, PhD (University of Northern Colorado)

Lehigh undergraduates may enroll in either of the College of Education's 5-year teacher certification areas: Elementary Education (grade levels preK through 4) and Secondary Education (grade levels 7 through 12). A Minor in Education is offered through the College of Arts and Sciences.

For information on the 5-year programs, see below. For information on the Education Minor, see the College of Arts and Sciences 'Minor Programs in the College'.

5-YEAR MASTER OF EDUCATION IN ELEMENTARY EDUCATION AND PREK-4 TEACHER CERTIFICATION

The College of Education offers a five-year degree program that is designed to allow students to earn both a bachelor's degree and a master's degree in five years instead of the traditional six. The combined degree program leads to either a B.A. or B.S. degree in an academic discipline from the College of Arts and Sciences, the P.C. Rossin College of Engineering and Applied Sciences, or the College of Business, and an M.Ed. degree in Elementary Education. In addition, students also earn eligibility for an Instructional I teaching certificate from the Pennsylvania Department of Education (PDE) in grades PreK-4.

PROGRAM OF STUDY FOR PREK-4 CERTIFICATION:
B.A. or B.S. plus Master of Education (M.Ed.) in Elementary Education and PA Certification eligibility. This 42-credit (minimum) master's program prepares students for certification as PreK-4 teachers. Students complete coursework in three categories:

Core Course Work (21 credit hours)

- SPED 332 Education and Inclusion of Individuals with Special Needs in K-12 3
- TLT 380 Child Development and Cognition 3
- TLT 404 Diversity, Families, and School Collaborations in K-12 3
- TLT 405 Principles and Applications of K-12 Assessment 3
- TLT 407 Instructional Design for K-12 Classrooms 3
- TLT 409 K-12 Classroom Environment and Management 3
- TLT 411 Early Childhood Education 3

Development of Professional Skills (18 credit hours)

- TLT 412 Social Studies in PreK through 4th Grade 3
- TLT 420 Literacy in PreK through 4th Grade: Reading and Its Foundations 3
- TLT 422 Literacy in PreK through 4th Grade: Writing and Its Foundations 3
- TLT 426 Science in PreK through 4th Grade 3
- TLT 428 Mathematics and Numeracy in PreK through 4th Grade 3
- SPED 465 Advanced Inclusionary Practices in K-12 3

Extended Field Experience (3-6 credit hours)

- TLT 444 General Education Student Teaching and Seminar 1-6

In order to be eligible for PreK-4 certification, by the time a student finishes the program he or she must have demonstrated competence in the core content areas for that certification. At time of acceptance, each student will be informed of any additional content-area coursework he or she will be required to complete in order to demonstrate competence in the PreK-4 core content areas. The student is responsible for completing this coursework prior to applying for PreK-4 certification. The credits for this coursework are not included in the master’s degree.

Distribution of coursework across undergraduate and graduate study:

Sophomore Year (3 credit hours)

Junior Year (3 credit hours)

Senior Year (12 credit hours)

College of Education - Summer (12 credits)

College of Education - Fall (9 credits)

College of Education - Spring (3-6 credits)

Students in the 5-year program will take 18 credits pre-bachelor's and an additional 27 credits post-bachelor's. However, the University requires that master's degrees carry at least 30 credits minimum. This means students in the 5-year program must have at least 3 credits "left over" from their bachelor's program to move across to the College of Education to put toward their master's degree.
5-YEAR MASTER OF EDUCATION IN SECONDARY EDUCATION AND 7-12 TEACHER CERTIFICATION

The College of Education offers a five-year degree program that is designed to allow students to earn both a bachelor’s degree and a master’s degree in five years instead of the traditional six.

The combined degree program leads to (1) a B.A./B.S. degree in an academic discipline from the College of Arts and Sciences, the P.C. Rossin College of Engineering and Applied Sciences, or the College of Business, and (2) an M.Ed. degree in Secondary Education. In addition, students also earn eligibility for Instructional I teacher certification from the Pennsylvania Department of Education (PDE) in one of the 8 subject areas below:

- Biology 7-12
- Chemistry 7-12
- Earth and Space Science 7-12
- English 7-12
- General Science 7-12
- Mathematics 7-12
- Physics 7-12
- Social Studies 7-12

PROGRAM OF STUDY:

B.A. or B.S. plus Master of Education (M.Ed., 33 credits minimum) and Pennsylvania teacher certification eligibility. In addition to meeting the requirements for the bachelor’s degree, students must satisfy the Pennsylvania Department of Education guidelines for demonstrated content-area competence (see below).

Students complete coursework in three categories:

Core Coursework (15 credits)

SPED 332 Education and Inclusion of Individuals with Special Needs in K-12 3
TLT 404 Diversity, Families, and School Collaborations in K-12 3
TLT 405 Principles and Applications of K-12 Assessment 3
TLT 407 Instructional Design for K-12 Classrooms 3
TLT 409 K-12 Classroom Environment and Management 3

Development of Professional Skills (12 credits)

Content-area teaching methods course with approval of adviser (one of the following):

TLT 431 Social Studies in Middle Level and High School Education 3
TLT 434 English in Middle Level and High School Education 3
TLT 436 Science in Middle Level and High School Education 3
TLT 438 Mathematics in Middle Level and High School Education 3

Plus:

TLT 432 Reading and Critical Thinking in Middle Level and High School Education 3
SPED 465 Advanced Inclusionary Practices in K-12 3
TLT XXX Elective with adviser approval 3

Extended Field Experiences (6-9 credits)

TLT 440 Pre-professional Seminar 3
TLT 444 General Education Student Teaching and Seminar 1-6

In order to be eligible for secondary certification, by the time a student finishes the program he or she must have demonstrated competence in the subject matter area of that certification. Each student upon admission meets with the content-area specialist in the field in which that student seeks secondary certification. The content-area specialist, who is a faculty member in the College of Arts and Sciences, reviews the student’s transcripts and compares that student’s coursework with the content-area guide sheet approved by the Pennsylvania Department of Education (PDE). Following this audit, the content-area specialist will identify what additional coursework in the content-area is needed, if any. The student is responsible for completing this coursework prior to applying for secondary certification. The credits for this course work are not included in the M.Ed. degree.

Students in the secondary teacher-preparation program are expected to have completed almost all their content area coursework prior to going out to student teach. This is important because student teachers need to have mastery of their content in order to fulfill their responsibilities to their students and to derive maximum benefit from the student teaching experience.

Distribution of coursework across undergraduate and graduate study:

Sophomore Year (3 credit hours)
Junior Year (6 credit hours)
Senior Year (6 credit hours)

College of Education - Summer (6 credits)
College of Education - Fall (9 credits)
College of Education - Spring (3-6 credits)

Students in this program unable to accrue enough credits outside their undergraduate degree programs may need to take additional credits after beginning graduate study in order to reach the 33-credit minimum.

Students in this program who wish to obtain the Master of Arts (M.A.) degree rather than the M.Ed. degree may petition to change to that degree after admission to graduate study. The M.A. degree requires 42 credits instead of 33 credits and has specific content-area expertise requirements. See the M.A. degree description for its requirements.

Master of Arts in Teaching and Learning

The 30-credit master’s in Teaching and Learning degree program comprises a 15-credit core (5 courses) and 15 credits of electives.

The goal of the post-certification master’s in Teaching and Learning is to provide professionally oriented practicing classroom teachers an in-depth understanding of classroom learning environments and experience in classroom-based research methods. These classroom teachers will enhance their pedagogical knowledge and skills, the design of classroom learning environments, and develop innovative curricula and learning activities. For the Master of Arts degree, 12 credits of content-area courses must be taken outside the College of Education.

Core Coursework (15 credits)

EDUC 403 Research 3
EDUC 471 Diversity and Multicultural Perspectives 3
TLT 401 Overview of Teaching and Learning 3
TLT 403 Instructional Design 3
TLT 480 Curriculum Theory and Design 3

Electives: Teaching Field Content (15 credits)

For the M.A.: Must include 12 credits of content-area courses taken outside the College of Education (300 level and above). Content-area course taken outside the College of Education (300 level and above)

Content-area course taken outside the College of Education (300 level and above)

Content-area course taken outside the College of Education (300 level and above)

Content-area course taken outside the College of Education (300 level and above)

EDUC 419 Second Language Acquisition (SLA) Theory 3
Master of Science in Instructional Technology

A thirty-credit masters degree offered through the Teaching, Learning, and Technology program. The program is aimed at those interested in the use of technology in education, particularly preK-12 and post secondary settings.

The 30-credit Master of Science in Instructional Technology program focuses on the planning and use of instructional technology in preK-12 and post secondary settings and non-formal learning environments (such as museums and science centers). The program is targeted toward individuals from varied backgrounds who wish to help educators or learn themselves to design, develop, and incorporate technology applications more effectively in diverse educational settings including preK-12, post secondary education, and informal learning environments. This is an appropriate degree for those who teach in the classroom and online, technology specialists, informal educators, and others interested in effectively using information and communications technologies to enhance instruction.

The program is designed to help develop skills that can be used to create new curriculum and learning activities to meet the demands of a changing technological society and the needs of new generations of students. As such, graduates may be designing online courses, enhance existing curriculum with emerging technologies, or may work as technology specialists, assisting with the integration of technology in academic and informal learning environments. The Instructional Technology graduate program is intended for both current professionals in the education field as well as those who are seeking an advanced degree to upgrade their skills and knowledge base related to technology.

College Core Requirements (3 credits)

EDUC 471 Diversity and Multicultural Perspectives 3

Program Core Requirements (15 credits)

TLT 401 Overview of Teaching and Learning 3
TLT 403 Instructional Design 3
TLT 458 Introduction to Multimedia Programming and Resource Development for Learning 3
TLT 460 Advanced Multimedia Programming and Resource Development for Learning 3
TLT 476 Assessment of Instructional Technologies 3

Electives (pick 4 for 12 credits)

TLT 367 Environmental Education 3
TLT 368 Teaching and Learning with Geospatial Tools 3
TLT 462 Special Topics in Development of Instructional Resources and Technologies for Learning 1-3
TLT 470 Technology for Teaching and Learning 3
TLT 474 Large-scale Planning and Implementation of Educational Technology 3
TLT 480 Curriculum Theory and Design 3
EDUC 493 Internship in: (with subtitle) 1-6

Other electives as approved by advisor 0-3

Master of Science in Teaching, Learning, and Technology

The master of science in Teaching, Learning, and Technology is a 30-credit master's program. The TLT M.S. is available ONLY to students previously admitted to the TLT Ph.D. program and specifically those students who are NOT completing their doctorate. This MS is provided solely for those students who have completed the core coursework (i.e., 30 or more credits completed, including 12 credits in Foundations, 3 credits in Research, and 15 credits from other courses listed and/or through directed research) but are unable to progress through the culminating research projects of a doctoral degree. There

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 421</td>
<td>Intercultural Communication</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 422</td>
<td>Theory and Practice for Second Language Learning</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 423</td>
<td>Second Language Assessment</td>
<td>3</td>
</tr>
<tr>
<td>TLT 367</td>
<td>Environmental Education</td>
<td>3</td>
</tr>
<tr>
<td>TLT 368</td>
<td>Teaching and Learning with Geospatial Tools</td>
<td>3</td>
</tr>
<tr>
<td>TLT 470</td>
<td>Technology for Teaching and Learning</td>
<td>3</td>
</tr>
<tr>
<td>Other electives as approved by advisor</td>
<td>0-3</td>
<td></td>
</tr>
</tbody>
</table>

Master of Education in Teaching and Learning

The 30-credit master's in Teaching and Learning degree program comprises a 15-credit core (5 courses) and 15 credits of electives.

The goal of the post-certification master's in Teaching and Learning is to provide professionally oriented practicing classroom teachers an in-depth understanding of classroom learning environments and experience in classroom-based research methods. These classroom teachers will enhance their pedagogical knowledge and skills, the design of classroom learning environments, and develop innovative curricula and learning activities.

Core Coursework (15 credits)

EDUC 403 Research 3
EDUC 471 Diversity and Multicultural Perspectives 3
TLT 401 Overview of Teaching and Learning 3
TLT 403 Instructional Design 3
TLT 480 Curriculum Theory and Design 3

Electives (15 credits, select courses from the tracks below)

Track 1: Technology in School Settings
TLT 458 Introduction to Multimedia Programming and Resource Development for Learning 3
TLT 460 Advanced Multimedia Programming and Resource Development for Learning 3
TLT 462 Special Topics in Development of Instructional Resources and Technologies for Learning 1-3
TLT 470 Technology for Teaching and Learning 3
TLT 476 Assessment of Instructional Technologies 3
Other electives as approved by advisor 0-3

Track 2: English as a Second Language
EDUC 391 Educational Linguistics 3
EDUC 419 Second Language Acquisition 3
EDUC 420 Contemporary Issues in English Language Learner Education 3
EDUC 422 Pedagogy for Second Language Learning 3
EDUC 423 Curriculum and Materials Design for English Language Learners 3
Other electives as approved by advisor 0-3

Track 3: Teaching Field Content
Content-area course taken outside the College of Education (300 level and above)
TLT 367 Environmental Education 3
TLT 368 Teaching and Learning with Geospatial Tools 3
TLT 494 Culminating Research Project 3
Other electives as approved by advisor 0-3

Lehigh University 2019-2020 3
is no thesis requirement for this master of science; it is a coursework-only masters. Awarding of such degree shall be dependent upon the student meeting all relevant university and College of Education requirements for master's degrees.

**Doctor of Philosophy in Teaching, Learning, and Technology**
A 48-credit, post-master's doctoral degree offered through the Teaching, Learning, and Technology program.

The doctorate in Teaching, Learning, and Technology (TLT) is a 48-credit, post master's Ph.D. program. The TLT Ph.D. program employs a scientist/practitioner model of learning. That is, research is not separate from application or practice. Our doctoral students collaborate closely with faculty to generate new theories and classification systems, innovative curricula, technology-integrated learning environments, authentic approaches to assessing learning, and a wide range of creative methods of teaching and learning in a global world highly interconnected by technology.

In keeping with the scientist/practitioner model, our doctoral students learn through innovative approaches, including research-based strategies for curriculum delivery, synchronous and asynchronous environments, and a wide range of other technology-enhanced designs and approaches for learning. Students take about 42 credits of coursework in addition to their qualifying examination preparation, doctoral research project, and dissertation project. Coursework is individualized according to the concentration students decide to pursue. Also, many of the course assignments are project-based, which will allow students to apply concepts they are learning to their particular area of interest. In addition, the choice of research topic and projects is also up to the student—in consultation with his/her faculty adviser and within the broader context of the field, of course.

**Foundations (12 credits)**

**Required:**
- EDUC 471 Diversity and Multicultural Perspectives 3
- TLT 401 Overview of Teaching and Learning 3
- TLT 402 Critical Reading and Writing 3
- TLT 403 Instructional Design 3

**Research (12 credits)**

**Required:**
- EDUC 403 Research 3
- EDUC 408 Introduction to Statistics 3
- EDUC 409 Analysis of Experimental Data 3

**Electives (select at least one):**
- EDUC 405 Qualitative Research Methods 3
- EDUC 410 Univariate Statistical Models 3
- EDUC 411 Multivariate Statistical Models 3
- EDUC 412 Advanced Applications of Psychometric Principles 3
- EDUC 461 Single-Subject Research Design 3

Other statistical research course in TLT, COE, or A&S as approved by adviser.

**Professional Cognate (12 credits)**

**Required:**
- TLT 480 Curriculum Theory and Design 3

**Electives:**
- EDUC 491 Advanced Seminars: (with subtitle) 1-6
- EDUC 493 Internship in: (with subtitle) 1-6
- EDUC 496 Doctoral Research Seminar 3
- TLT 458 Introduction to Multimedia Programming and Resource Development for Learning 3
- TLT 460 Advanced Multimedia Programming and Resource Development for Learning 3

**Supervised Research Projects (6 credits minimum)**

**Required:**
- TLT 486 Doctoral Research Project 3
- TLT 499 Dissertation 1-15

**Electives:**
- EDUC 493 Internship in: (with subtitle) 1-6
- EDUC 494 Field Work in: (with subtitle) 3
- EDUC 495 Independent Study in: (with subtitle) 1-6

Additional topic seminars, dissertation proposal or maintenance of candidacy, or elective with permission of adviser.

**Professional Sub-Specialty (6 credits)**

These credits are intended to advance the students’ research agenda or career goals (such as a enhanced subject matter knowledge, mentored field/practical experiences with outreach programs, specialized coursework, college teaching, grant writing, and the like) with adviser approval.

**Courses**

**TLT 367 (ES 367) Environmental Education 3 Credits**
Introductory environmental education course designed to prepare students to implement environmental education opportunities in formal and non-formal education settings. Topics include history and philosophy of environmental education, environmental laws and regulations, GIS, environmental issues and decision making, curriculum integration and environmental education teaching methodologies. This is a Web enhanced containing both online and fieldwork components.

**TLT 368 (ES 368) Teaching and Learning with Geospatial Tools 3 Credits**
Exploration of geospatial tools, including but not limited to global positioning systems (GPS), geographic information systems (GIS), and related visualization tools (e.g. Google Earth). Application of these tools and techniques to instructional settings, including appropriate pedagogy and assessment.

**TLT 380 Child Development and Cognition 3 Credits**
Introduction to physical, motor, perceptual, cognitive, language, emotional, social, and gender development of young children and adolescents. Developmental history, theories, and research, as well as the effect of culture, family, peers, media, and schooling on the individual and groups. Students investigate typical and atypical development and explore the implications of individual differences for teaching and learning, with an emphasis on evidence-based instructional practices designed to optimize the growth and development of all learners. Explores mental health issues and at-risk students.

**TLT 391 Workshops 1-3 Credits**
Cooperative study of current educational problems. Provides elementary, secondary, and special education teachers an opportunity to work at their own teaching levels and in their own fields. Limited to six credits during a summer session but the student may register for more than one workshop provided there is no duplication in subject matter.

**Repeat Status:** Course may be repeated.
TLT 394 Special Topics in Education: 1-3 Credits
Examination of a topic of research or professional interest in education. Subtitle will vary. May be repeated for credit as subtitle varies.
Repeat Status: Course may be repeated.

TLT 401 Overview of Teaching and Learning 3 Credits
Foundations and key concepts in learning and instructional theory. Cognition and brain-based research with a focus on innovations in teaching and learning.

TLT 402 Critical Reading and Writing 3 Credits
Using literature to build persuasive written arguments. Searching and identifying promising sources, distilling research findings, synthesizing literature to support an argument, and organizing written materials to enhance persuasiveness. Suited to those writing qualifying projects, dissertation proposals, dissertations, funding proposals, conference proposals, and journal articles.

TLT 403 Instructional Design 3 Credits
Social, cognitive, and environmental factors in designing for teaching and learning. Systems theory applied to learning settings. Special emphasis on motivational theories and technological affordances.

TLT 404 (SPED 404) Diversity, Families, and School Collaborations in K-12 3 Credits
Cultural and linguistic diversity as critical variables in educational equity for all learners, including ELL. Explores home-school partnerships, family and professional collaboration, and teacher self-awareness. Implementing culturally sensitive and responsive classroom practices as well as forming collaborative relationships with families that respect diversity of family contexts. Collaborative, multidisciplinary teaching to support, optimize, and advocate for student's educational needs and connect to community services and resources available to individuals and families. Addresses family mental health issues and wraparound services.

TLT 405 (SPED 405) Principles and Applications of K-12 Assessment 3 Credits
Assessment applied to learning in classroom learning environments, including universal screening and progress monitoring. Discusses assessment approaches, ways to implement assessment, and use of assessment tools to monitor all students, including ELL and students with disabilities. Use of data-management and grading systems. Addresses diagnostic assessments for student placement and analysis of assessment data to tailor instruction to diverse student needs. Emphasis on research-based practices of assessment to inform instructional decision-making consistent with the RtII framework.

TLT 407 Instructional Design for K-12 Classrooms 3 Credits
Introduces the systematic design of instruction following the Response to Instruction and Intervention (RtII) and Universal Design for Learning models. Explores theories of learning and instructional applications as a part of technology-based and standards-aligned classroom education grounded in the use of a quality, research-based core curriculum and effective instructional practices to meet the needs of all learners. Addresses appropriate use of instructional technologies for universal learning. Students will plan, design, and develop student-centered, standards-aligned, technology-supported instruction and appropriate learner assessments.

TLT 409 (SPED 409) K-12 Classroom Environment and Management 3 Credits
Designing inclusive classroom environments that maximize learning. Emphasis on fostering a community of learners using connections among classroom arrangement, classroom management, and cognitive development to create positive learning outcomes for all students, including ELL learners and students with disabilities. Addresses the tiered model of prevention and positive behavior support, including the role of functional assessment and individual positive behavior support plans in classroom management. Highlights the ways a positive climate for learning involves establishing and maintaining partnerships with families.

TLT 410 The Writing Process 3 Credits
Developmental characteristics of children's writing and relationships among writing, spelling and reading. Predictors of writing achievement, teaching strategies and activities, and evaluation schemes will be emphasized, K-12.

TLT 411 (SPED 411) Early Childhood Education 3 Credits
Introduction to development of early childhood education in the U.S. Emphasizes evidence-based methods and materials to assist young children in the learning process, including arrangement of indoor/ outdoor space, developmentally appropriate practices, and the design of instruction to foster young children's emotional, social, language, cognitive, physical, and creative development. Includes embedded instruction and adaptations for students with identified disabilities, children at risk for developing disabilities, and children with culturally and linguistically diverse backgrounds, and family collaboration within the instructional planning process.

TLT 412 Social Studies in PreK through 4th Grade 3 Credits
Overview of Pennsylvania's PreK-4 Standards for social studies, including: Pennsylvania history, United States history, economics, civics and government, citizenship, political science/government, and geography. Development, implementation and evidence-based assessment of preK-grade 4 social studies curricula. Effective teaching techniques such as lesson planning, inclusive practices, integrating instructional technologies into instruction, reflecting on teaching, and the latest research-based teaching and assessment methods. Emphasis on alignment of instruction with standards.

TLT 420 Literacy in PreK through 4th Grade: Reading and Its Foundations 3 Credits
Knowledge of the theories, methods, and materials that can be used to teach reading and early reading skills in PreK-grade 4. Understanding of the skills of successful readers. Evidence-based practices in reading instruction and data-based decision-making to teach reading to all students, including students with disabilities and English learners. Strategies to partner with caregivers to enhance reading an early reading skills.

TLT 422 Literacy in PreK through 4th Grade: Writing and Its Foundations 3 Credits
Knowledge of the theories, methods, and materials that can be used to teach writing and foundational skills in PreK-4. Understanding of the developmental aspects of writing and the skills of successful writers. Evidence-based practices in writing instruction and data-based decision-making to teach writing to all students, including students with disabilities and English learners.

TLT 424 Children's Literature in Elementary Education 3 Credits
Role of literature in the instructional program of the elementary schools. Use of trade books for individualized instruction in reading, language arts, mathematics, science, and social studies.

TLT 426 Science in PreK through 4th Grade 3 Credits
Overview of inquiry-based activities and investigations to promote science learning in preK-grade 4 classrooms. Emphasis on Pennsylvania's PreK-4 Standards for Science and Technology and Environment and Ecology standards and aligning instruction with standards. Activities include planning effective lessons, trying out new methods of teaching, reflective practice, inclusionary methods, and integrating instructional technologies into science learning. Evidence-based assessment types are highlighted within instructional contexts.

TLT 428 Mathematics and Numeracy in PreK through 4th Grade 3 Credits
Trends, theories, activities and manipulative materials for teaching early numeracy and elementary mathematics. Pre-school development and in-school skills and concepts, including sets, systems of numeration, experience with numbers, number operations and concepts, numerals, measurement, early algebra, and elements of geometry. Implications of developmental differences and early non-school experiences on learner readiness and skills. Helping parents support their children's mathematics conceptual development. Research-based practices and inclusionary approaches to teach mathematics to learners from a variety of backgrounds and across ability levels.
TLT 431 Social Studies in Middle Level and High School Education 3 Credits
Middle and high school curriculum, content, teaching strategies, and instructional materials for the social studies. Emphasis on organizing content, using appropriate methods, testing and evaluation, and appropriate integration of technology. Overview of Pennsylvania's 4-8 and 8-12 standards for social studies and related standards from the National Council for the Social Studies and other national organizations. Explores relevant research, courses of study, textbooks, and teacher-made materials. Addresses inclusive evidence-based and standards-aligned instructional approaches and techniques, including co-teaching.

TLT 432 Reading and Critical Thinking in Middle Level and High School Education 3 Credits
Development of reading in the secondary content areas (English/language arts, mathematics, science, social studies). Highlights effective teaching strategies in critical areas, such as higher order reading and study skills. Addresses analysis of evidence based methods and current research for improving the reading development and analytical skills of all students.

TLT 434 English in Middle Level and High School Education 3 Credits
Curricula, philosophy, methods, strategies, and materials for the teaching of middle and high school English. Literature, genres, and the nature of text and text differences. Critical analysis and drawing inferences from narrative text and poetry. Techniques for teaching and enhancing writing in various styles. Applications of technology and assessment principles. Addresses inclusive evidence-based and standards-aligned instructional approaches and techniques, including co-teaching.

TLT 436 Science in Middle Level and High School Education 3 Credits

TLT 438 Mathematics in Middle Level and High School Education 3 Credits
Standards-based and technology-intensive curricula, instructional activities, and manipulative aids for mathematics in middle level and high schools. This course models and explores an investigative and hands-on approach to secondary mathematics instruction. Particular attention given to learning theories, curriculum issues, and recommendations arising from state, national, and international assessments. Research-based practices and inclusionary approaches to teach mathematics to learners from a variety of backgrounds and across a range of abilities. Addresses standards-aligned instructional approaches and techniques, including co-teaching.

TLT 440 Pre-professional Seminar 3 Credits
Study, directed observation of, and initial practice in the various phases of teaching in secondary schools. Guided opportunities to try out strategies to facilitate the inclusion of special education students, differentiated instructional practices, and standards-aligned and evidence-based instructional approaches in actual school settings. Consent of program coordinator required.

TLT 442 (SPED 442) General Education and Special Education Student Teaching and Seminar 1-6 Credits
Intensive practice in the application of principles of teaching for both general and special education settings in a supervised internship in the schools (for dual certification). Regular meetings among student teachers for critical analysis and discussion of classroom instructional practices, as illustrated by the student teachers' experiences in the schools. Practical mentoring on professionalism, applying differentiated instructional models in real-world setting, and aligning instruction with standards. Consent of program director required.

TLT 444 General Education Student Teaching and Seminar 1-6 Credits
Intensive practice in the application of principles of teaching for general education settings in a supervised internship in the schools. Regular meetings among student teachers for critical analysis and discussion of classroom instructional practices, as illustrated by the student teachers' experiences in the schools. Practical mentoring on professionalism, applying differentiated instructional models in real-world setting, and aligning instruction with standards. Consent of program director required.

TLT 454 Applied Instructional and Interface Design Principles 3 Credits
Exploration and application of design models for learning. Special emphasis on the application of perception theory, communication theory, and learning theory to the design of media for teaching and learning.

Prerequisites: TLT 403

TLT 456 Instructional Design and Development Studio 3 Credits
Studio-based, authentic and collaborative design experiences led by a faculty mentor. Students work in teams to complete substantial multimedia design and development projects.

Prerequisites: TLT 454 and TLT 460

TLT 458 Introduction to Multimedia Programming and Resource Development for Learning 3 Credits
Introduction to programming and resource development tools used in the creation of interactive multimedia teaching and learning materials.

TLT 460 Advanced Multimedia Programming and Resource Development for Learning 3 Credits
Advanced exploration of programming and resource development tools used in the creation of interactive teaching and learning materials.

Prerequisites: TLT 458

Repeat Status: Course may be repeated.

TLT 466 Field Experience: General Education Certification 1-3 Credits
Intensive practice in the application of principles of teaching in general education in a supervised experience in the schools for students who already hold special education certification. Practical mentoring on professionalism, applying differentiated instructional models in real-world setting, and aligning instruction with standards. Consent of the program director.

TLT 470 Technology for Teaching and Learning 3 Credits
Analysis of available technologies (hardware, software, and Web resources), and identification of technologies matched to learner needs in traditional and/or non-traditional settings.

TLT 472 Online Teaching and Learning 3 Credits
Examination of contemporary research on online learning and recognized best practices on the design and delivery of online, hybrid, and/or flipped courses or course modules. Emphasis on online activities to experience ways to maximize instructor presence and student engagement, collaboration, and achievement.

TLT 474 Large-scale Planning and Implementation of Educational Technology 3 Credits
Addresses topics such as planning, maintaining, funding, networking, staffing, staff development, and monitoring of educational technology implementations.

TLT 476 Assessment of Instructional Technologies 3 Credits
Techniques for evaluating technology implementations for teaching and learning. Focus on topics such as instrumentation, data collection and analysis, drawing conclusions from data sets, and preparing reports for stakeholders.
TLT 480 Curriculum Theory and Design 3 Credits
Curricular models and their features, with a focus on curriculum development and enactment. Special emphasis on design principles, curriculum's role in K-12 settings, and technology-enhanced curriculum.

TLT 482 Practicum in University Teaching: Teaching, Learning & Technology 1-4 Credits
Mentored and guided co-teaching focused on the design, organization, pedagogy and assessment of university courses in Teaching, Learning and Technology. Students in this course will work with a faculty member to apply best practices in university teaching with feedback while co-teaching students in a course in the College of Education. Students taking the course must meet the college standards for participation and be approved by the program director and department chair. May be repeated for credit.
Repeat Status: Course may be repeated.

TLT 486 Doctoral Research Project 3 Credits
This course provides students with the opportunity to design and conduct research studies under the supervision of specific faculty.

TLT 492 Classroom Research Methods 3 Credits
Introduces students to classroom research design paradigms and the assumptions behind them, use of the literature, developing research questions, qualitative and quantitative procedures, research design, sampling design, data collection, data analysis, and reporting research results using educational applications.

TLT 494 Culminating Research Project 3 Credits
Designing and conducting research projects in classroom settings.

TLT 499 Dissertation 1-15 Credits