Recommended Academic Coursework for Middle Level Mathematics and Science (Grades 4-8)

**Mat 105 Mathematics for Teachers I (3 cr):**
An introduction to the fundamentals of teaching mathematics in the elementary school. Topics include: sets, functions, logic, numeration systems, number theory, properties of number systems, and introduction to statistics. Open only to Education students or by permission of instructor. Students may not take both MAT 105 and MAT 101 for credit. Prerequisite: satisfactory score on the Mathematics Placement Test.

**MAT 106 Mathematics for Teachers II (3 cr):**
An introduction to the fundamentals of teaching mathematics in the elementary school. Topics include: probability, statistics, geometry in 2 and 3 dimensions, measurement concepts, problem solving strategies, technology and mathematics. Open only to EDU students or permission of instructor. Prerequisite: MAT 105.

**MAT 204 Introduction to Mathematical Logic (3 cr):**
This course is an introduction to basic properties and operation of sets, functions and relations. A discussion of set cardinality, ordered sets, ordering theorems, set paradoxes, algebra of proposition and Boolean algebra. Number theory topics include: factorization, divisibility theory, congruencies, and Diophantine equations.

**MAT 205 Mathematics for Teachers III (3 cr):**
A survey of concepts required of middle school teachers. Topics include: algebra, exponential and logarithmic functions, trigonometry, and discrete mathematics. Prerequisite: MAT 106.

**MAT 208 Introductory Statistics (4 cr):**
This course in applications of statistics and probability is designed for such areas as sociology, business, economics, medicine and psychology. Topics include descriptive statistics, data organization and graphical methods, laws of probability, rules review of probability, linear correlation and regression, binomial and normal distributions, sampling and statistical inference. Varied computer applications, using the statistical software package SPSS, are required. Not open to math or science majors. Students earning credit for this course cannot earn credit for MAT 209. Prerequisite: satisfactory score on the Mathematics Placement Test.

**ED 463 Methods of Middle School Mathematics (3 cr):**
This course is a comprehensive study of how to plan and deliver instruction in the areas of mathematics that are taught in today’s middle schools. Topics include lesson planning and implementation, use of instructional media and materials including mathematical computer software, and learning theories in mathematics education. Co-requisite: ED 436.

**BIO 103 Principles of Biology (4 cr):**
Provides a survey of important biological concepts and principles to all living organisms. Topics include prokaryotic and eukaryotic cells, energetic, comparative physiology, evolution and ecology. Integrates laboratory and classroom work. This course is limited to science majors, biology minors, and biology-secondary education majors.

**BIO 320 Ecology (4 cr):**
This 4-credit lecture/laboratory course examines the ecological and evolutionary basis of natural systems from a hierarchical perspective. The major topics covered include: population and community ecology, interactions in communities, and ecosystem functions. Prerequisites: BIO 103, 104 or permission of the instructor.

**CHE 102 Physical Science (3 cr):**
Integrated course of chemistry, physics, and earth science with application and experiments to demonstrate the forces of nature and its environment. Three lecture hours per week. Open to non-science majors.
PHY 110 General Physics I (4 cr):
Introduction to standard non-calculus college physics course. Topics include Newton’s laws of motion, work, energy, impulse, momentum, properties of solids, liquids, and gases, heat, and the laws of thermodynamics. Course includes three hours laboratory per week. Prerequisite: high school algebra.

ED 464 Methods of Middle School Science (3 cr):
This course is a comprehensive study of how to plan and deliver instruction in the areas of science that are taught in today’s middle schools. Topics include lesson planning and implementation, use of instructional media and materials (including science computer software), and learning theories in science education. Co-requisite: Ed 436.

SPE 100: Overview of Human Exceptionalities (3 cr):
Designed for prospective classroom teachers, this course surveys the process and provision of special education services for students with special needs. The causes and characteristics of individuals with mental retardation, learning disabilities, emotional and behavior disorders, autism, and sensory impairment, and the impact of disabilities on families are addressed. This course fulfills the Human Diversity graduation requirement.

ED 203 Social Foundations for the Middle Learner (3 cr):
This introductory course provides an overview of the historical, philosophical, social and cultural foundations of education. Topics covered include professionalism, ethical and legal issues and the philosophy of middle school education. Co-requisite ED 206.

ED 206: Field Experience Stage I (20 hours) (1 cr):
This experience is an introduction to the teaching profession, which allows students the opportunity to observe classrooms in operation and to apply theory to practice using a lesson plan design that emphasizes small group/whole group instruction. All education majors should do this field experience in an inclusive general education setting with access to a separate special education setting as well. Students will have the opportunity to observe a practicing teacher in action and work with students in the classroom. As described in the Handbook, this experience is the first developmental phase, which provides active observation and participation.

ED 209: Planning, Instruction & Assessment (3 cr):
Study of research-based teaching methods and education measures for students in diverse classrooms including lesson planning, and implementation, and assessment.

ED 210: Methods for the Elementary Inclusive Classroom (3 cr):
This course addresses the learning needs of exceptional and at-risk students, kindergarten through high school, and the needed instructional management strategies to be acquired by special education and regular education teachers who will teach these students in inclusive classroom settings. This course fulfills the Human Diversity graduation requirement. Prerequisite: ED 209, SPE 100.

ED 215 Adolescent Development (3 cr):
This course explores the various and multi-dimensional elements of adolescent development, from ages 9 to 14, including social, emotional, physical, moral, cognitive, and academic. In addition, the individual’s place in society and the role of peers will be addressed.

ED 306: Field Experience Stage II (20 hours) (1 cr):
This experience provides the teaching candidate with the opportunity to apply theory to practice using classroom management and instructional strategies. It will include supervised observations of teaching with an emphasis on management skills, instruction, and assessment. Special Education dual majors should do this field experience in special education. Co-requisite: ED 313 or ED 375.
ED 313: Managing Classroom Learning Communities (3 cr):
This course will prepare teachers to be educational leaders who effectively manage their classrooms. It will focus on taking a pro-active approach to create a positive learning environment for all students. This course will operate from a perspective that it is the teacher’s responsibility to bring an enhanced level of professionalism and strong sense of ethical behavior to the classroom. Special attention will be given to the recognition that today’s classrooms are inclusive and contain students with a variety of needs and learning styles that need to be accommodated. A successful learning environment requires effective lesson plans and appropriate communication with students, parents, administration, and community resources. Co-requisite: ED 306 (Secondary Education Students).

ED 333 Literary Methods for Middle Level and Secondary Inclusive Classroom (3 cr):
This course is concerned with helping adolescents become more skillful with reading, writing, speaking, listening, viewing and performing in all content areas. Participants will explore strategies and methods to effectively improve literacy skills (comprehension, vocabulary, writing) of middle and secondary students within the context of demanding subject matter classes. Course content will include strategies to address students with special educational needs, English language learners and other diverse learning styles.

ED 402: Professional Seminar (3 cr):
This course focuses on the development of dispositions required in the teaching profession. The concept of professionalism will be defined and discussed in depth. Other topics will include the importance of effective communication, building and sustaining relationships, and practicing professional responsibilities. These topics will be studied with regards to diversity of ethnicity, culture, socio-economic status, and family structures that influence and shape policies in schools today. Teacher candidates will also become thoroughly familiar with the evaluation instruments used to assess teacher competence and professionalism in Pennsylvania public schools. Co-requisite: ED 436 (Early Childhood Education students).

ED 436 Field Experience III (150 hours) (4 cr):
This experience provides the candidate with the opportunity to apply theory to practice in learning, motivation and development through lesson plans, assessment and management. The experience will provide opportunity to develop lessons that include Reading, Math, Science, Social Studies strategies. This semester will provide students with practical classroom experience on a daily basis. Dual major students will split the classroom experience between a special education setting and an inclusive general education setting. There will be supervised observations of the teacher candidates by school district and University personnel. The observations will emphasize teaching individual lessons. Co-requisite for Pre-K-4: ED 300, ED 403, ED 404, ED 414, Corequisite for Middle School: ED 460, ED 461, ED 463, ED 464.

ED 460 Teaching Literacy/ Language Arts to Developing Readers (3 cr):
The purpose of this methods course is to provide teacher candidates with the strategies and skills needed to extend the literacy, language arts, and reading skills of students, ages 9-13. Course content will include an in depth study of current research, methodology for teaching vocabulary and comprehension, use of assessments, and lesson planning for various instructional formats. Corequisite: ED 436.

ED/HIS 461 Social Studies Methods Pennsylvania’s Founding and the World (3 cr):
This course examines the historical and contextual development of Pennsylvania from 1683 to 1824. As a methodology course, it focuses on the types of research and methods of presentation within a classroom setting. Cross-listed with HIS 461.

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ED 464 Methods of Middle School Science (3 cr):
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ED 470 Student Teaching (10 cr):
Classroom instruction of early childhood, middle school, secondary, and/or special education students during a fourteen-week period. Prerequisite: Completion of all other coursework and Praxis Tests. Co-requisite: 472.

ED 472 Student Teaching Seminar (2 cr):
Provides guidance in clinical experiences as well as review of current educational research and issues related to professional development. Co-requisite: ED 470.