UNIVERSITY OF MARYLAND GLOBAL CAMPUS

UNIVERSITY OF MARYLAND GLOBAL CAMPUS (UMGC)
DEPARTMENT OF EDUCATION

Conceptual Framework (CF) Alignment: UMGC's professional education unit instills in all candidates the belief that all students can learn and learn at high levels, and that they as teachers and teacher candidates are instrumental in ensuring that this learning occurs. This transcript review form is used for MAT admissions in conjunction with Key Assessments 2 – Description of transcript analysis process, which aligns with CF Learning Objective 1: Teaching for Learning – The candidate acts upon academic content, professional and pedagogical knowledge, and understanding of students to maximize student achievement. The use of this transcript review form also aligns with the Department's Professional Dispositions category 1: Relationship with students through curriculum and instruction.

MAT TRANSCRIPT REVIEW FORM FOR SECONDARY PHYSICS, 7-12 GRADE TEACHER CERTIFICATION – NSTA/NGSS STANDARDS 2013

NSTA/NGSS Assessment Standards for Certification	Typical Courses Aligned with Standards (Course Samples)	Courses Completed (Include Prefix, Number, and Name)	# of Credits
Forces and Motion • Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects • Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object	• Mechanics • General Physics • Principles of Physics		

• Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration • Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the object • Apply science and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision			
Types of Interactions • Ask questions about data to determine the factors that affect the strength of electric and magnetic forces • Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects • Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact • Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the	• Electricity and Magnetism • Electromagnetic Phenomena • Modern Physics		

gravitational and electrostatic forces between objects • Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current • Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials			
Definitions of Energy • Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system • Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative position of particles (objects)	• Energy Science and Technology • Introduction to Particle Physics		
Relationship Between Energy and Forces • Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object	• Physics and the Energy Problem • Basics of Condensed Matter Physics		

• Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction			
Wave Properties • Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave • Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various objects • Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media; • Evaluate questions about the advantages of using digital transmission and storage of information • Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other • Communicate technical information about how some technological devices use the principles of wave behavior and wave	• General Physics • Electricity and Magnetism • Introduction to Quantum Mechanics • Vibrations, Waves, and Optics		

interactions with matter to transmit and capture information and energy			
Information Technologies and Instrumentation • Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals	• Computers in Physics • Experiments in Linear Electronics • Introduction to Computational Physics		
The Universe and its Stars • Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fission in the sun's core to release energy that eventually reaches Earth in the form of radiation • Construct an explanation of the Big Bang Theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe • Communicate scientific ideas about the way stars, over their lifetime, produce elements	• Galaxies and Cosmology • Stars, Galaxies, and the Early Universe • Astrophysics I or II		
Earth and the Solar System • Use mathematical or computational representations to predict the motion of orbiting objects in the solar system	• The Sky and the Solar System • Astrophysics I or II		
		Total Credits:	

Note: Applicants may qualify to enter the MAT program with a content specialization in Physics if they have an undergraduate major in the certification area, or if they have completed 30 credit hours of coursework in Physics.

Secondary Physics, 7-12 Grade Teacher Certification
Full standards are available at NSTA: https://ngss.nsta.org/