



**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 CHEMISTRY,  
7-12 GRADE TEACHER CERTIFICATION – NSTA/NGSS STANDARDS 2013**

<b>NSTA/NGSS Assessment Standards for Certification</b>	<b>Typical Courses Aligned with Standards (Course Samples)</b>	<b>Courses Completed (Include Prefix, Number, and Name)</b>	<b># of Credits</b>
Structure and Properties of Matter <ul style="list-style-type: none"><li>• Atomic composition of simple molecules and extended structures</li><li>• Properties of substances before and after the substances interact</li><li>• Synthetic and natural resources</li></ul>	<ul style="list-style-type: none"><li>• Introduction to Chemistry</li><li>• Core Concepts in Chemistry</li><li>• Organic Chemistry</li></ul>		

<ul style="list-style-type: none"> <li>• Particle motion, temperature, and state of a pure substance when thermal energy is added or removed</li> <li>• Periodic table</li> <li>• Patterns of chemical properties</li> <li>• Structure of substances at the bulk scale</li> <li>• Total bond energy</li> </ul>			
<p><b>Chemical Reactions</b></p> <ul style="list-style-type: none"> <li>• Conservation of matter</li> <li>• Thermal energy</li> <li>• Effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occur</li> <li>• Equilibrium</li> <li>• Conservation of mass during chemical reaction</li> </ul>	<ul style="list-style-type: none"> <li>• Inorganic Chemistry</li> <li>• Physical Chemistry I or II</li> <li>• Theoretical Foundations of Physical Chemistry</li> </ul>		
<p><b>Nuclear Processes</b></p> <ul style="list-style-type: none"> <li>• Composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay</li> </ul>	<ul style="list-style-type: none"> <li>• Nuclear Chemistry</li> <li>• Radiochemistry</li> <li>• Spectroscopic Methods</li> </ul>		
<p><b>Definitions of Energy</b></p> <ul style="list-style-type: none"> <li>• Relationships of kinetic energy to the mass of an object and to the speed of an object</li> <li>• Thermal energy transfer;</li> </ul>	<ul style="list-style-type: none"> <li>• Elements of Physical Chemistry</li> <li>• Electrochemistry</li> </ul>		

<ul style="list-style-type: none"> <li>• Relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles</li> </ul>			
<p>Conservation of Energy and Energy Transfer</p> <ul style="list-style-type: none"> <li>• Computational models to calculate the change in energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known</li> <li>• Transfer of thermal energy when two components of different temperatures are combined within a closed system (second law of thermodynamics)</li> </ul>	<ul style="list-style-type: none"> <li>• Physical Chemistry I or II</li> <li>• Thermodynamics</li> </ul>		
<p>Energy in Chemical Processes &amp; Everyday Life</p> <ul style="list-style-type: none"> <li>• Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy</li> </ul>	<ul style="list-style-type: none"> <li>• Chemistry, Technology, and Society</li> </ul>		
<p>The Role of Water in Earth's Surface Processes</p> <ul style="list-style-type: none"> <li>• Properties of water and its effects on Earth materials and system processes</li> </ul>	<ul style="list-style-type: none"> <li>• Global Change</li> <li>• Chemistry of Water</li> </ul>		

<p>Weather and Climate</p> <ul style="list-style-type: none"> <li>• Results of variations in the flow of energy into and out of Earth's systems result on changes of climate</li> <li>• Cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere</li> </ul>	<ul style="list-style-type: none"> <li>• Organic Chemistry</li> <li>• Environmental Geochemistry</li> </ul>		
<p>Natural Resources</p> <ul style="list-style-type: none"> <li>• Design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios</li> </ul>	<ul style="list-style-type: none"> <li>• Green Chemistry</li> <li>• Geochemistry</li> </ul>		
<p>Global Climate Change</p> <ul style="list-style-type: none"> <li>• Geoscience data and global climate models</li> <li>• Relationships among Earth's systems and how those relationships are being modified due to human activity</li> </ul>	<ul style="list-style-type: none"> <li>• Environmental Chemistry</li> </ul>		
		<b>Total Credits:</b>	

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

**Secondary Chemistry, 7-12 Grade Teacher Certification**

Full standards are available at NSTA: <https://ngss.nsta.org/>