**Assessment 2: Template for Course Grades and/or Transcript Analysis**

**(2012 NCTM CAEP Secondary Standards)**

**Instructions**

Completion of this form provides the required information for using grades and/or transcript analysis as evidence of candidates’ content knowledge. This document is designed to be editable so that programs can use only sections that are applicable to program type. Programs should not change the structure of the tables provided, but can delete tables or lines that are not needed. Boxes will expand as needed.

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| **Institution Name** |  |
| **Program Name** |  |
| **Program Type (e.g., Baccalaureate or M.Ed.)** |  |

*Program of Study and Course Descriptions:* A complete program of study and set of official course descriptions for all required courses to be used in this evaluation should be attached separately in Section I of the program report.

**Part 1.** *Description of the Assessment*

Identify the required mathematics major courses chosen for inclusion and supply a rationale for the selection of this particular set of mathematics or mathematics education courses.

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*Transcript Review Process for Post-Bac and Masters Programs*

The following questions should be addressed in cases where a program is using a transcript review for certification. The transcript review form should be attached in Section I of the program report. This section can be deleted for undergraduate only programs.

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| In cases of a transcript review process, describe how the program ensures that the courses being reviewed have the necessary content to be equivalent to the institutional course and that the mathematical domain competencies and mathematical processes indicated are included. This description should include the process used when course titles do not clearly align or courses are taught within related fields. |  |
| What is the limit by which coursework must have been completed? (e.g., within the last 3 years) |  |
| How does the program ensure that graduate candidates have appropriate experience with the use of technology and representational tools within the learning of mathematics? |  |
| When a candidate needs remediation, what is the process for ensuring the candidate receives the appropriate remediation before program completion? |  |

**Part 2.** *Course Alignment with Elements of* *NCTM CAEP Standards (2012)* *and with NCTM CAEP Mathematics Content for Secondary*

*Technology and Representational Tools Including Concrete Models by Competency*

Describe technology and representational tools, including concrete models, used in **required** courses that address competencies. Name the course, tools, and competency by code (e.g., A.1.3) in the discussion of how candidates have multiple opportunities to learn with technology and representational tools across domains.

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| **A.1 Number and Quantity** |  |
| **A.2 Algebra** |  |
| **A.3 Geometry and Trigonometry**  |  |
| **A.4 Probability and Statistics** |  |
| **A.5 Calculus** |  |
| **A.6 Discrete Mathematics** |  |

*Rationale for Content Preparation through Coursework for Standard 1*

All secondary mathematics teachers should be prepared with depth and breadth in the following mathematical domains: Number, Algebra, Geometry, Trigonometry, Statistics, Probability, Calculus, and Discrete Mathematics. All teachers certified in secondary mathematics should know, understand, teach, and be able to communicate their mathematical knowledge with the breadth of understanding reflecting the following competencies for each of these domains. The program should match **required** coursework to individual competencies within each domain. The rationale should specifically provide evidence and discussion that justifies how the competency indicated in column 1 is addressed in the specific course(s).

| **A.1. Number and Quantity** To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to number and quantity with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models: |
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|  | **Required Course Number(s) and Name(s) with a specific description of how the indicated competency is addressed in the course(s)** |
| A.1.1 Structure, properties, relationships, operations, and representations including standard and non-standard algorithms, of numbers and number systems including integer, rational, irrational, real, and complex numbers |  |
| A.1.2 Fundamental ideas of number theory (divisors, factors and factorization, primes, composite numbers, greatest common factor, least common multiple, and modular arithmetic)  |  |
| A.1.3 Quantitative reasoning and relationships that include ratio, rate, and proportion and the use of units in problem situations |  |
| A.1.4 Vector and matrix operations, modeling, and applications |  |
| A.1.5 Historical development and perspectives of number, number systems, and quantity including contributions of significant figures and diverse cultures |  |

| **A.2. Algebra** To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to algebra with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models. |
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|  | **Required Course Number(s) and Name(s) with a specific description of how the indicated competency is addressed in the course** |
| A.2.1 Algebraic notation, symbols, expressions, equations, inequalities, and proportional relationships, and their use in describing, interpreting, modeling, generalizing, and justifying relationships and operations |  |
| A.2.2 Function classes including polynomial, exponential and logarithmic, absolute value, rational, trigonometric, including those with discrete domains (e.g., sequences), and how the choices of parameters determine particular cases and model specific situations |  |
| A.2.3 Functional representations (tables, graphs, equations, descriptions, recursive definitions, and finite differences), characteristics (e.g., zeros, intervals of increase or decrease, extrema, average rates of change, domain and range, and end behavior), and notations as a means to describe, reason, interpret, and analyze relationships and to build new functions |  |
| A.2.4 Patterns of change in linear, quadratic, polynomial, and exponential functions and in proportional and inversely proportional relationships and types of real-world relationships these functions can model |  |
| A.2.5 Linear algebra including vectors, matrices, and transformations  |  |
| A.2.6 Abstract algebra, including groups, rings, and fields, and the relationship between these structures and formal structures for number systems and numerical and symbolic calculations |  |
| A.2.7 Historical development and perspectives of algebra including contributions of significant figures and diverse cultures |  |

| **A.3. Geometry and Trigonometry** To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to geometry and trigonometry with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models. |
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|   | **Required Course Number(s) and Name(s) with a specific description of how the indicated competency is addressed in the course** |
| A.3.1 Core concepts and principles of Euclidean geometry in two and three dimensions and two-dimensional non-Euclidean geometries  |  |
| A.3.2 Transformations including dilations, translations, rotations, reflections, glide reflections; compositions of transformations; and the expression of symmetry in terms of transformations  |  |
| A.3.3 Congruence, similarity and scaling, and their development and expression in terms of transformations |  |
| A.3.4 Right triangles and trigonometry  |  |
| A.3.5 Application of periodic phenomena and trigonometric identities |  |
| A.3.6 Identification, classification into categories, visualization, and representation of two- and three-dimensional objects (triangles, quadrilaterals, regular polygons, prisms, pyramids, cones, cylinders, and spheres) |  |
| A.3.7 Formula rationale and derivation (perimeter, area, surface area, and volume) of two- and three-dimensional objects (triangles, quadrilaterals, regular polygons, rectangular prisms, pyramids, cones, cylinders, and spheres), with attention to units, unit comparison, and the iteration, additivity, and invariance related to measurements |  |
| A.3.8 Geometric constructions, axiomatic reasoning, and proof |  |
| A.3.9 Analytic and coordinate geometry including algebraic proofs (e.g., the Pythagorean Theorem and its converse) and equations of lines and planes, and expressing geometric properties of conic sections with equations |  |
| A.3.10 Historical development and perspectives of geometry and trigonometry including contributions of significant figures and diverse cultures |  |

| **A.4. Statistics and Probability** To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to statistics and probability with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models. |
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|   | **Required Course Number(s) and Name(s) with a specific description of how the indicated competency is addressed in the course** |
| A.4.1 Statistical variability and its sources and the role of randomness in statistical inference  |  |
| A.4.2 Creation and implementation of surveys and investigations using sampling methods and statistical designs, statistical inference (estimation of population parameters and hypotheses testing), justification of conclusions, and generalization of results |  |
| A.4.3 Univariate and bivariate data distributions for categorical data and for discrete and continuous random variables, including representations, construction and interpretation of graphical displays (e.g., box plots, histograms, cumulative frequency plots, scatter plots), summary measures, and comparisons of distributions  |  |
| A.4.4 Empirical and theoretical probability (discrete, continuous, and conditional) for both simple and compound events  |  |
| A.4.5 Random (chance) phenomena, simulations, and probability distributions and their application as models of real phenomena and to decision making |  |
| A.4.6 Historical development and perspectives of statistics and probability including contributions of significant figures and diverse cultures |  |

| **A.5. Calculus** To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to calculus with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models. |
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|   | **Required Course Number(s) and Name(s) with a specific description of how the indicated competency is addressed in the course** |
| A.5.1 Limits, continuity, rates of change, the Fundamental Theorem of Calculus, and the meanings and techniques of differentiation and integration |  |
| A.5.2 Parametric, polar, and vector functions |  |
| A.5.3 Sequences and series |  |
| A.5.4 Multivariate functions |  |
| A.5.5 Applications of function, geometry, and trigonometry concepts to solve problems involving calculus |  |
| A.5.6 Historical development and perspectives of calculus including contributions of significant figures and diverse cultures |  |

| **A.6. Discrete Mathematics** To be prepared to develop student mathematical proficiency, all secondary mathematics teachers should know the following topics related to discrete mathematics with their content understanding and mathematical practices supported by appropriate technology and varied representational tools, including concrete models. |
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|   | **Required Course Number(s) and Name(s) with a specific description of how the indicated competency is addressed in the course** |
| A.6.1 Discrete structures including sets, relations, functions, graphs, trees, and networks |  |
| A.6.2 Enumeration including permutations, combinations, iteration, recursion, and finite differences  |  |
| A.6.3 Propositional and predicate logic |  |
| A.6.4 Applications of discrete structures such as modeling and designing data structures  |  |
| A.6.5 Historical development and perspectives of discrete mathematics including contributions of significant figures and diverse cultures |  |

*Rationale for Standards other than Standard 1 through Coursework*

Elements from Standard 2 are included for your convenience, additional elements can be added as needed in the same manner and/or elements from Standard 2 can be deleted.

| **Element number** | **Required Course Number(s) and Name(s) with a specific description of how the indicated element is addressed in the course(s)** |
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| **2a)** Use problem solving to develop conceptual understanding, make sense of a wide variety of problems and persevere in solving them, apply and adapt a variety of strategies in solving problems confronted within the field of mathematics and other contexts, and formulate and test conjectures in order to frame generalizations. |  |
| **2b)** Reason abstractly, reflectively, and quantitatively with attention to units, constructing viable arguments and proofs, and critiquing the reasoning of others; represent and model generalizations using mathematics; recognize structure and express regularity in patterns of mathematical reasoning; use multiple representations to model and describe mathematics; and utilize appropriate mathematical vocabulary and symbols to communicate mathematical ideas to others.  |  |
| **2c)** Formulate, represent, analyze, and interpret mathematical models derived from real-world contexts or mathematical problems. |  |
| **2d)** Organize mathematical thinking and use the language of mathematics to express ideas precisely, both orally and in writing to multiple audiences.  |  |
| **2e)** Demonstrate the interconnectedness of mathematical ideas and how they build on one another and recognize and apply mathematical connections among mathematical ideas and across various content areas and real-world contexts.  |  |
| **2f)** Model how the development of mathematical understanding within and among mathematical domains intersects with the mathematical practices of problem solving, reasoning, communicating, connecting, and representing. |  |
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**Part 3.** *Grade Policy and Minimum Expectation*

Submit grading policy/definitions of grades that are used by the institution or program and the minimum expectation for candidate performance (e.g., candidates must achieve a C or better in required coursework).

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**Part 4.** *Data Tables*

Select the appropriate combination of data tables. The number of completers in the data tables for each academic year must be consistent with the number of completers reported in Section I of the program report.

Data Table A (Coursework Taken at Submitting Institution)

Data Table A is to be used for undergraduate and graduate completers whose mathematics and/or mathematics education coursework is mostly completed at the submitting institution. Mean course grades and grade distribution (range) in selected required mathematics or mathematics education courses, number of undergraduate or graduate completers, and percentage of completers meeting the minimum expectation disaggregated by level (e.g., undergraduate or graduate program completers) and by academic year must be included.

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| **Grades in Required Mathematics and/or Mathematics Education Courses** **Secondary Mathematics Education****Indicate Undergraduate or Graduate Program Completers** |
| **Grade Scale:** Insert grade point values associated with each letter grade. |
|  | **INSERT ACADEMIC YEAR FOR COHORT GROUP** | **INSERT ACADEMIC YEAR FOR COHORT GROUP** |
| **Course Number and Name** | **Mean Course Grade\* and (Range)** | **Number of Completers** | **% of Completers Meeting Minimum Expectation****(INDICATE MINIMUM GRADE EXPECTATION)** | **Mean Course Grade\* and (Range)** | **Number of Completers** | **% of Completers Meeting Minimum Expectation****(INDICATE MINIMUM GRADE EXPECTATION)** |
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Data Table B (Mathematics Major Coursework GPA):

Data Table B is to be used for both undergraduate and graduate program completers to report overall mathematics GPAs across all required mathematics major courses listed on the plan of study or transcript review form submitted in Section I of the program report. The table should be duplicated for each program reported. Data Table B may replace Data Table A for a graduate level program that relies on coursework taken at another institution. Data disaggregated by academic year on completers’ mean grade point average (GPA) and grade distribution (range) across all required undergraduate mathematics major courses, number of completers, and percentage of completers meeting the minimum expectation must be included.

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| **Mean GPA in Required Mathematics Major Courses for Secondary Mathematics Education Completers****Indicate Program Type (Post-Baccalaureate or MAT or M. Ed.) Program** |
| **Grade Scale:** Insert grade point values associated with each letter grade. |
| **Academic Year** | **Mean GPA and****(Range)** | **Number of Completers**  | **% of Completers Meeting Minimum Expectation****(INDICATE MINIMUM GRADE EXPECTATION)** |
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Data Table C (Graduate Program Transcript Analysis Results):

Data Table C is to be used to report transcript analysis results for a graduate level program that relies on coursework taken at another institution. Data disaggregated by academic year on the number of completers for whom a transcript analysis was done, how many completers required remediation, nature of remediation (e.g., coursework or special project) by course or content, and the number of completers, if any, who received waivers (explanation required) from the process must be included.

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| **Transcript Analysis Results for Secondary Mathematics Education Completers****Indicate Program Type (Baccalaureate, Post-Baccalaureate or MAT or M. Ed.) Program** |
| **Academic Year** | **Number of Completers** | **Number Requiring Remediation** | **Nature of Remediation by Course or Content** | **Number Receiving Waivers** | **Waiver Explanation** |
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**Part 5.** *Analysis*

Provide an analysis of grade data. An explanation of any inconsistencies within the data tables must accompany the data tables.

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