WEAVE Assessment – Measure and Target

MS in Applied Mathematics and Computer Science

Applied Mathematics Concentration

SLO 1: Mathematical Modeling. (G1, G2, G3, G6) Students are able to apply mathematical techniques in analysis to translate complicated real-world scenarios into mathematical models.
Courses: M448, M463, M560, M577

M 1 (Measure 1): Course items from M448, M463, M560 and M577, such as assignments, projects, quizzes, tests and exams. By the end of semester, each course instructor will complete a form. A sample form is given below.

Program: MS in Applied Mathematics and Computer Science with concentration in applied mathematics
Learning outcome: Mathematical Modeling
Check one category for each student according to your assessment

Name	Sufficient or Above	Below Sufficient
Student A		
Student B		
Student C		

Below is the rubric for assessing learning outcome 1.

SLO 1: Mathematical Modeling. Students are able to apply mathematical techniques in analysis to translate complicated real-world scenarios into mathematical models.	
Exemplary	The student is able to relate an application problem to the correct model, to estimate the parameters correctly, and to provide appropriate interpretations. The student understands how to use the model to answer questions. The questions are answered accurately and completely.
Proficient	The student is able to relate an application problem to the correct model, to estimate the parameters of the model, and to give interpretations. But there are some minor errors or gaps in the work. The student understands how to use the model to answer questions. The questions are answered less accurately and/or with minor omissions.
Sufficient	The student knows the basics but is short of total understanding of how the model relates to an application problem. Some interpretations are muddled but least 75% of the interpretations are correct. The student uses the model to answer the questions but is short of total understanding of how to do it accurately. The questions are answered partially and/or with one or two mistakes that are beyond minor errors, but at least 75% of questions are answered to the point.
Marginal	The student knows the basics but has some misunderstanding of how the model relates to an application problem. The interpretations make some sense but are muddled. The student attempts to use the model to answer the questions but lacks a clear understanding of how to do it. The questions are answered partially and/or with one or two significant mistakes, but a portion of questions is answered to the point.
Below Marginal	The student does not really understand how the model relates to an application problem, knows little about how to estimate the parameters, and interpretations are mainly illogical. The student knows little about how to use the model to answer questions. The questions are not answered or answered with major conceptual and computational mistakes.

Target: At least 85% of the students will meet the criteria of "Sufficient" or above in the rubric.

SLO 2: Advanced Statistical Techniques. (G1, G2, G3, G4, G6) Students are able to apply statistical techniques to select appropriate statistical methodologies and models based on properties of particular data sets, perform analysis and draw inferences from models.
Courses: M466, M562, M565, M574, M575, M576.

M 1: Course items from M466, M562, M565, M574, M575, M576, such as assignments, projects, quizzes, tests and exams. By the end of semester, each course instructor will complete a form. A sample form is given below.

Program: MS in Applied Mathematics and Computer Science with concentration in applied mathematics
Learning outcome: Advanced Statistical Techniques
Check one category for each student according to your assessment

Name	Sufficient or Above	Below Sufficient
Student A		
Student B		
Student C		

Below is the rubric for assessing learning outcome 2.

SLO 2: Advanced Statistical Techniques. Students are able to apply statistical techniques to select appropriate statistical methodologies and models based on properties of particular data sets, perform analysis and draw inferences from models.	
Exemplary	The student is able to select appropriate statistical methodologies/models, to carry out the data analyses correctly, to clearly articulate the required assumptions while developing a statistical model or implementing a statistical technique, and to provide clear and correct interpretations. The student understands how to apply appropriate statistical techniques to answer the questions. The questions are answered accurately and completely.
Proficient	The student is able to select appropriate statistical methodologies/models, to carry out the data analyses, to articulate the required assumptions while developing a statistical model or implementing a statistical technique, and to provide interpretation, but with minor errors and omissions. The student understands how to apply appropriate statistical techniques to answer the questions. The questions are answered less accurately and/or with minor omissions.
Sufficient	The student knows the basics but is short of total understanding of how to carry out statistical analyses and/or how to articulate the assumptions while developing a statistical model or implementing a statistical technique. The work contains mistakes and omissions that are beyond minor errors, but at least 75% of the work is correct. The student attempts to use statistical techniques to answer questions but is short of total understanding of how to do it accurately. The questions are answered partially and/or with one or two mistakes that are beyond minor errors, but at least 75% of the questions are answered to the point.
Marginal	The student knows the basics but has some misunderstanding of how to carry out statistical analyses and/or how to articulate the assumptions while developing a statistical model or implementing a statistical technique. The work contains significant mistakes and omissions, but a fraction of the work makes sense. The student attempts to use statistical techniques to answer questions but lacks a clear understanding of how to do it. The questions are answered partially and/or with one or two significant mistakes, but a portion of questions is answered to the point.
Below Marginal	The student understands little about how to carry out statistical analyses, cannot really articulate the assumptions made in developing a statistical model or implementing statistical techniques. The student knows little about how to apply statistical techniques to answer questions. The questions are not answered or answered with major conceptual and computational mistakes.

Target: At least 85% of the students will meet the criteria of "Sufficient" or above in the rubric.

SLO 3: Problem Solving. (G1, G2, G4, G6) Students are able to apply mathematical and statistical thinking to new settings; work with complicated problems in a variety of subject areas and to synthesize solutions to such problems.
Courses: M448, M463, M466, M551, M562, M565, M 571, M574, M575, M576, M577.

M 1: Course items from M448, M463, M466, M551, M562, M565, M 571, M574, M575, M576, M577., such as assignments, projects, quizzes, tests and exams. By the end of semester, each course instructor will complete a form. A sample form is given below.

Program: MS in Applied Mathematics and Computer Science with concentration in applied mathematics
Learning outcome: Problem Solving
Check one category for each student according to your assessment

Name	Sufficient or Above	Below Sufficient
Student A		
Student B		
Student C		

Below is the rubric for assessing learning outcome 3.

SLO 3: Problem Solving. Students are able to apply mathematical and statistical thinking to new settings; work with complicated problems in a variety of subject areas and to synthesize solutions to such problems.	
Exemplary	The student demonstrates a clear understanding of the problem, and is able to articulate the steps that lead to the solution and to work through all steps in a logical order. The work is well-organized, correct, and complete, and demonstrates appropriate use of relevant mathematical/statistical techniques. All assumptions, conditions and solutions are clearly stated.
Proficient	The student demonstrates an understanding of the problem, and is able to list the steps that lead to the solution and to work out each step. The work is mostly correct. Relevant concepts and mathematical/statistical techniques are presented. However, the work is not so well-organized. There are minor omissions and/or errors in using mathematical or statistical techniques, in the specifications of the conditions and assumptions, and/or in the answers.
Sufficient	The student demonstrates a basic understanding of the problem and the steps that may work. The work is incomplete and/or with one or two mistakes that are beyond minor errors, but at least 75% of the necessary contents are correctly presented.
Marginal	The student demonstrates a basic understanding of the problem and the steps that may work. The work is partially correct and incomplete due to one or two missing components, but a significant portion of the necessary contents is presented.
Below Marginal	The student shows little understanding of the problem. Work is incorrect and incomplete. Either there are conceptual mistakes in understanding of the problem or in the understanding of the appropriate mathematical technique and its implementation.

Target: At least 85% of the students will meet the criteria of "Sufficient" or above in the rubric.

SLO 4: Communication Skills. (G5) Students are able to give clear and organized explanations of mathematical and statistical ideas, to precisely articulate arguments, and to interpret the results. Courses: M448, M463, M466, M551, M560, M562, M565, M571, M574, M575, M576, M577

M 1: Course items from M448, M463, M466, M551, M560, M562, M565, M571, M574, M575, M576, M577, such as assignments, projects, quizzes, tests and exams. By the end of semester, each course instructor will complete a form. A sample form is given below.

Program: MS in Applied Mathematics and Computer Science with concentration in applied mathematics
Learning outcome: Communication Skills
Check one category for each student according to your assessment

Name	Sufficient or Above	Below Sufficient
Student A		
Student B		
Student C		

Below is the rubric for assessing learning outcome 4.

SLO 4: Communication Skills. Students are able to give clear and organized explanations of mathematical and statistical ideas, to precisely articulate arguments, and to interpret the results.	
Exemplary	The student is able to communicate mathematical/statistical ideas effectively, orally and/or in writing, to the identified audience using coherent, unambiguous and concise explanation and/or description, presenting strong supporting arguments which are logically sound and complete. The presentation may include correct and appropriate graphics, examples and counter-examples. The student uses correct terminology and notations from the language of mathematics/statistics to reason clearly and to make precise arguments.
Proficient	The student communicates well to the identified audience, gives reasonably clear explanations or descriptions, as well as supporting arguments which are logically sound but may contain some minor gaps. The presentation is fairly complete and may include appropriate diagrams. The student uses terminology and notations from the language of mathematics/statistics to make clear arguments for the most part, but there are some minor ambiguities and gaps in the reasoning.
Sufficient	The student uses mathematical/statistical terms in a presentation. A portion of the explanation or description is missing or ambiguous. Some statements are vague, disconnected, or difficult to understand for the identified audience, but at least 75% of the necessary contents are explained to the point.
Marginal	The student makes significant progress towards completion of a mathematical augment. While a portion of the presentation makes sense, a significant part of the explanation or description is ambiguous or flawed. Some statements are vague or difficult to understand for the identified audience. Mathematical arguments may be incomplete or may be based on logically unsound premise.
Below Marginal	The student communicates ineffectively; words do not support the intended purpose; may include expressions which misrepresent the problem, arguments which are illogical, or the statements which are mostly irrelevant to the situation.

Target: At least 85% of the students will meet the criteria of "Sufficient" or above in the rubric.

Note: W (withdrawal) is excluded from the assessment since there is no full information. For each learning outcome, the percentage of students assessed at or above the level of "Sufficient" is computed from all graduate mathematics courses in the two most recent years combined.

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