**WEAVE Assessment – Measure and Target (Draft)**

**MS in Applied Mathematics and Computer Science**

**Computer Science Concentration**

**SLO 1: Proficiency in problem solving.** (G1, G2) Students demonstrate proficiency in solving advanced problems requiring the use of programming skills and the use of advanced software tools. Courses: B524, B538, B551, B553, B561, P565, B581, B583, and thesis.

**M 1 (Measure 1):** Course items from B524, B538, B551, B553, B561, P565, B581, B583, such as assignments, projects, quizzes, tests and exams, and the thesis. 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 Computer Science
Learning outcome:  Proficiency in 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 1.

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| **SLO 1:  Proficiency in problem solving.** Students demonstrate proficiency in solving advanced problems requiring the use of programming skills and the use of advanced software tools. | |
| 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 analytical and programming. All the special cases are tested. |
| 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. The algorithm works correctly in most cases. However, the work is not so well-organized. There are minor omissions and/or errors in dealing with special cases. |
| 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 80% 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 programming techniques and its implementation. |

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

**SLO 2: Advanced Development Skills.** (G3) Students have the ability to work individually and in a team and lead a software project from the concept stage to the finished product.
Courses: B524, B538, B551, B553, B561, P565, B581, B583, and thesis.

**M 1**: Course items from B524, B538, B551, B553, B561, P565, B581, B583, such as assignments, projects, quizzes, tests and exams, and the thesis. 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 Computer Science
Learning outcome:  Advanced Development 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 3.

| **SLO 3:  Advanced Development Skills.** Students have the ability to work individually and in a team and lead a software project from the concept stage to the finished product. | |
|---|---|
| Exemplary | The student is able to work individually and in a team to implement a software project from the design stage to the prototype/deliverable stage. The student understands the top-down approach in the design stage and is able to implement various parts of the project correctly and test them completely. The student is able to correctly connect various components into the final product. The student is able to answer all the questions about the project correctly. |
| Proficient | The student is able to work individually and in a team to implement a software project from the design stage to the prototype/deliverable stage, but some minor difficulties are encountered along the way. The student might underestimate the complexity of some of the stages and may rush through without working out all the details properly. The student is mostly able to correctly connect various components into the final product. The student is able to answer all the questions about the project correctly but with minor errors. |
| Sufficient | The student basically understands the different stages in the development of the project, but might have difficulties with the work division or with allocating enough time for each stage. At least 80% of the project works correctly, but some aspects are missing that are beyond minor issues. A significant portion of the questions is answered correctly. |
| Marginal | The student understands the basic of project development, but either falls behind on his or her part of it, or is unable to correct some significant errors in the program.  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 complete a significant part of the project they are assigned and the implemented parts are not working properly.  The student lacks understanding of the overview of the project and how the different components work together. 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: Communication Skills.** (G5) Students are able to give clear and organized written and verbal explanations of computer science ideas, and to precisely articulate arguments. Courses: B503, B551, B553, B561, P565, B583, and thesis.

**M 1**: Course items from B503, B551, B553, B561, P565, B583, such as assignments, projects, quizzes, tests and exams, and the thesis. 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 Computer Science
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 written and verbal explanations of computer science ideas, and to precisely articulate arguments. | |
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| Exemplary | The student is able to communicate computer science ideas effectively, orally and/or in writing, to the identified audience using coherent, unambiguous and concise explanation and/or description, presenting strong supporting arguments that are logically sound and complete. The presentation may include appropriate graphics, examples and counter-examples. The student uses correct terminology and notations from the language of computer science 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 that 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 computer science to make clear arguments for the most part, but there are some minor ambiguities and gaps in the reasoning. |
| Sufficient | The student uses computer science 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 80% of the necessary contents are explained to the point. |
| Marginal | The student makes significant progress towards completion of an argument. 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. 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 that misrepresent the problem, arguments that are illogical, or the statements are mostly irrelevant to the situation. |

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

**SLO 4: Real Life Applications**. (G4) The students can solve real-life problems by applying algorithms and tools learned in class. Courses: B524, B538, B551, B553, B561, P565, B581, B583, and thesis.

**M 1**: Course items from B524, B538, B551, B553, B561, P565, B581, B583, such as assignments, projects, quizzes, tests and exams, and the thesis. 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 Computer Science
Learning outcome:  Proficiency with the Latest Technologies
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 6.

| **SLO 6: Real Life Applications**. The students can solve real-life problems by applying algorithms and tools learned in class. | |
|---|---|
| Exemplary | The student is able to relate a set of known algorithms with a real-life application, to adapt the parameters of the algorithm to the problem correctly, and to demonstrate the application of the algorithms. <br> The student understands how to use the algorithms to solve specific aspects of the application accurately and completely. |
| Proficient | The student is able to relate the algorithms to an application problem correctly, to adapt the parameters of the algorithm to the problem, and to demonstrate the application. But there are some minor errors or gaps in the work. <br> The student understands how to use the algorithm to solve specific aspects of the less accurately and/or with minor omissions. |
| Sufficient | The student is understand how to relate the algorithms to an application problem, but has some difficulty choosing the most appropriate one or in adapting the parameters of the algorithm to the problem. There are some errors in the work that are beyond minor, but the student can implement at least 80% of the work correctly. |
| Marginal | The student knows the basics but has some misunderstanding of how the algorithms relate to an application problem. The parameter adaptation makes some sense but is muddled. <br> The questions about the application 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 algorithms relate to the application problem and how to adapt the parameters. The student does not answer well questions about the algorithms and their applications and makes major conceptual and computational mistakes. |

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

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