

**M.S. Academic Assessment Plan  
Department of Horticulture  
University of Arkansas  
May 2023**

**Contact Information:** Department of Horticulture, Dr. Wayne Mackay, Professor and Department Head

**Departmental Mission:** The mission of the Department of Horticulture is to conduct applied and basic research to support and enhance the Arkansas horticultural industries; and to conduct high quality teaching and student research programs leading to BSA, MS, and PhD degrees.

**Program Goals:**

*(Program goals are broad general statements of what the program intends to accomplish and describes what a student will be able to do after completing the program. The program goals are linked to the mission of the university and college.)*

1. Graduates have the discipline-specific knowledge in horticultural and turf sciences required to perform successfully in appropriate-level private, government, or academic positions.
2. Graduates are able to critically analyze, synthesize, and evaluate new information to make informed decisions.
3. Graduates have the ability to solve complex, multidisciplinary problems.
4. Graduates are able to prepare and synthesize information to effectively communicate, both orally and in writing, with technical or scientific and non-technical audiences.
5. Graduates have expertise in research and analytical skills to conduct thesis research to contribute to the advancement of science.

**Student Learning Outcomes**

*(Student Learning Outcomes are defined in terms of the knowledge, skills, and abilities that students will know and be able to do as a result of completing a program. These student learning outcomes are directly linked to the accomplishment of the program goals.)*

1. Students will demonstrate the appropriate depth and breadth of discipline specific knowledge required to function as horticultural or turf science professionals.
2. Students will demonstrate the ability to critically evaluate situations or scenarios to arrive at well thought out and supported decisions and outcomes.
3. Students will demonstrate the ability to work through and solve complex, multidisciplinary problems.
4. Communication skills
  - a. Students will demonstrate the skills required to effectively communicate technical/scientific information in oral platforms to general and professional audiences.
  - b. Students will demonstrate the ability to integrate, organize, and effectively present written reports of technical/scientific information to general and

professional audiences.

5. Students will contribute to the advancement of science by acquiring research and analytical skills (e.g. conceptual, statistics, laboratory or field skills, etc.) to fulfill project requirements.

#### **Assessment Measure for Outcome 1**

- Achievement will be measured at the completion of a student's program during the **thesis defense, scored using a rubric.**
- This is a **direct** measure of student learning.
- Depth and breadth of discipline specific knowledge learned will be assessed through oral questions posed by a thesis examination committee. The length of the defense and number and type of questions will be subject to the committee's discretion based on the student's background and research focus and responses to questions.
- The rubric used for scoring is attached to this assessment plan.

#### **Acceptable and Ideal Targets** (not required for indirect measures).

- Acceptable: 70% of M.S. students defending their thesis will score "proficient" or greater.
- Ideal: All of the M.S. students defending their thesis will score "proficient" or greater.

#### **Key Personnel** (who is responsible for the assessment of this measure).

- Graduate advisory / thesis examination committee is the responsible party.

#### **Assessment Measure for Outcome 2**

- Achievement will be measured at the completion of a student's program during the **thesis defense, scored using a rubric.**
- This is a **direct** measure of student learning.
- Ability to think critically will be evaluated through oral questions posed by a thesis examination committee. The length of the defense and number and type of issues and scenarios posed to the student to evaluate critical thinking ability will be subject to the committee's discretion based on the student's background and research focus and responses to questions.
- The rubric used for scoring is attached to this assessment plan.

#### **Acceptable and Ideal Targets** (not required for indirect measures).

- Acceptable: 70% of M.S. students defending their thesis will score "proficient" or greater.
- Ideal: All of the M.S. students defending their thesis will score "proficient" or greater.

#### **Key Personnel** (who is responsible for the assessment of this measure).

- Graduate advisory / thesis examination committee is the responsible party.

### Assessment Measure for Outcome 3

- Achievement will be measured at the completion of a student's program during the **thesis defense, scored using a rubric.**
- This is a **direct** measure of student learning.
- Ability to think logically and progressively through multiple dimensions of a complex scenario or issue to solve problems will be evaluated through oral questions posed by a thesis examination committee. The length of the defense and number and type of issues and scenarios posed to the student to evaluate problem solving ability will be subject to the committee's discretion based on the student's background and research focus and responses to questions.
- The rubric used for scoring is attached to this assessment plan.

### Acceptable and Ideal Targets (not required for indirect measures).

- Acceptable: 70% of M.S. students defending their thesis will score "proficient" or greater.
- Ideal: All of the M.S. students defending their thesis will score "proficient" or greater.

### Key Personnel (who is responsible for the assessment of this measure).

- Graduate advisory / thesis examination committee is the responsible party.

### Assessment Measure for Outcome 4a

- Achievement will be measured at the completion of a student's program during the **thesis defense, scored using a rubric.**
- This is a **direct** measure of student learning.
- Effective oral communication will be evaluated during a presentation and question and answer period during the thesis defense. The thesis advisory / examination committee will evaluate the delivery of presentation, effectiveness of visual aids, and quality and organization of content. The committee will also ask questions following the presentation. The length of the question and answer period (number and type of questions posed to the student) will be subject to the committee's discretion based on the student's background and research focus, presentation provided by the student, and responses to questions.
- The rubric used for scoring is attached to this assessment plan.

### Acceptable and Ideal Targets (not required for indirect measures).

- Acceptable: 70% of M.S. students defending their thesis will score "proficient" or greater.
- Ideal: All of the M.S. students defending their thesis will score "proficient" or greater.

### Key Personnel (who is responsible for the assessment of this measure).

- Graduate advisory / thesis examination committee along with the seminar instructor are the responsible parties.

#### **Assessment Measure for Outcome 4b**

- Achievement will be measured at the completion of a student's program during the **thesis defense, scored using a rubric.**
- This is a **direct** measure of student learning.
- Effective written communication skills will be evaluated through the written thesis. The thesis advisory / examination committee will evaluate the quality and organization of content, quality of references, style, and adherence to convention in writing, attention to detail, and overall effectiveness and credibility in delivery.
- The rubric used for scoring is attached to this assessment plan.

#### **Acceptable and Ideal Targets** (not required for indirect measures).

- Acceptable: 70% of M.S. students defending their thesis will score "proficient" or greater.
- Ideal: All of the M.S. students defending their thesis will score "proficient" or greater.

#### **Key Personnel** (who is responsible for the assessment of this measure).

- Graduate advisory / thesis examination committee is the responsible party.

#### **Assessment Measure for Outcome 5**

- Achievement will be measured at the completion of a student's program during the **thesis defense, scored using a rubric.**
- This is a **direct** measure of student learning.
- The thesis advisory / examination committee will evaluate the quality of research and contribution of the scholarship to the advancement of science and the initiative, independence and quality of the student skills development in completion of the research through oral questioning in the thesis defense and reading of the written thesis. The length of the defense and number and type of questions will be subject to the committee's discretion based on the student's background and research focus and responses to questions.
- The rubric used for scoring is attached to this assessment plan.

#### **Acceptable and Ideal Targets** (not required for indirect measures).

- Acceptable: 70% of M.S. students defending their thesis will score "proficient" or greater.
- Ideal: All of the M.S. students defending their thesis will score "proficient" or greater.

#### **Key Personnel** (who is responsible for the assessment of this measure).

- Graduate advisory / thesis examination committee is the responsible party.

**Department of Horticulture**  
**Thesis/Dissertation Defense Performance Assessment Rubric**

**Student Learning Outcomes**

To assist with program assessment, in which of the following student learning outcomes did the student demonstrate proficiency?  
 Mark performance on a scale of 1 (not prepared, unskilled) to 4 (advanced, mastery of skill) in each Learning outcome box.

<b>Learning outcome</b>	<b>4</b> Advanced/Mastery	<b>3</b> Proficient/Adequate	<b>2</b> Developing/Beginning	<b>1</b> Unprepared/Unskilled
<b>Depth and breadth of discipline related knowledge</b>	Shows higher levels of learning - Clearly explains key concepts and principles; Understands current, relevant literature, and gaps in science; apply concepts to analyze new situations; demonstrates mastery of technical, statistical and/or relevant computer skills	Understands and applies key concepts and principles; Understands current, relevant literature; Collects, summarizes, correctly analyzes data; demonstrates competency of technical, statistical and/or computer skills relevant to discipline	Understands and applies key concepts and principles; some understanding of relevant literature; demonstrates adequate use of some technical, statistical and/or computer skills relevant to discipline	Incomplete and uncomprehensive knowledge of basics principles and ability to apply principle and concepts; demonstrates incomplete or unrefined use of technical, statistical and/or computer skills relevant to discipline
<b>Critical thinking</b>	Clearly and comprehensively states issue/problem. Thoroughly reviews literature and interprets data to evaluate scenarios and create solutions to new problems. Systematically and methodically analyzes own and others' assumptions and carefully evaluates relevance of contexts and limitations of a position. Thesis is imaginative, multidimensional, and conclusions are logical and reflect informed evaluation.	Issue/problem is stated, described, and clarified critically, so that understanding is not seriously impeded by omissions. Interpretation/evaluation is supported with evidence from the literature, but literature and experts are subject to questioning. Identifies own and others' assumptions, relevant contexts when presenting a position. Conclusions are logical and related to outcomes.	Issue/problem is stated critically, but is incompletely defined or explored. Literature review is incomplete, and there is little questioning of experts and assumptions. Acknowledges different sides of an issue. Conclusion is logically tied to information but is unidimensional and related to only some of the outcomes.	Unclear or ill-described issue/problem. Information is collected without interpretation or evaluation. Viewpoints of experts are not questioned. Shows emerging awareness of assumptions. Simple and obvious position. Conclusion is inconsistently tied to some of the information discussed; related outcomes are oversimplified.

<p><b>Problem solving</b></p>	<p>Constructs clear and insightful problem statement with evidence of all relevant contextual factors. Proposes one or more hypotheses and tackles problem with multiple approaches. Sensitive to ethical, logical, historical, and cultural dimensions of the problem. Deep and elegant, thorough and insightful, logical explanations. Examines feasibility of solution, and weighs impacts of solution, and considers need for further work.</p>	<p>Constructs a problem statement with adequate detail and evidence of most relevant contextual factors. Identifies multiple approaches for problem solving, some of which apply within a specific context. Comprehends the problem. Sensitive to ethical, logical, historical, and cultural considerations. Evaluation of solutions is adequate, and examines feasibility of solution, weighs impacts of solution, and considers some of the needs for further work.</p>	<p>Superficial problem statement with evidence of most relevant contextual factors. Identifies a single, “off the shelf” approach for solving the problem that does apply within a specific context. Evaluation of solution(s) is brief but includes history of problem, logic/reasoning, solution feasibility, and impacts of solution. Addresses the problem, but ignores relevant contextual factors and need for further work.</p>	<p>Limited ability to define a problem statement, related contextual factors, or specific or relevant solutions Superficial evaluation and/or irrelevant implementation of solutions that does not directly address the problem statement or consideration of need for further work.</p>
<p><b>Communication skills - oral</b></p>	<p>Clearly organized, cohesive content. Imaginative, memorable, and compelling. Presentation enhances effectiveness. Delivered at appropriate level. Polished delivery techniques (posture, gesture, eye contact, and vocal expressiveness). Confident speaker. Variety of supporting materials reference information or analysis that significantly supports the presentation or establishes credibility or authority. Central message is compelling (precise, appropriate, memorable, and strongly supported.)</p>	<p>Clear and consistent organization. Thoughtful and effective presentation. Delivered at appropriate level. Quality in delivery techniques (posture, gesture, eye contact, and vocal expressiveness. Supporting materials reference information or analysis that generally supports the presentation or establishes the presenter's credibility. Central message is clear and consistent with the supporting material.</p>	<p>Intermittently observable organizational pattern. Mundane language partially supports the presentation effectiveness. Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable. Supporting materials partially supports the presentation or establishes the presenter's credibility/authority on the topic. Central message is basically understandable.</p>	<p>Organizational pattern is not observable. Unclear language. Presentation is not appropriate to audience. Delivery detracts from the understandability of the presentation, and is uncomfortable. Insufficient supporting materials make reference to information or analysis that minimally supports the presentation or establishes the presenter's credibility/authority on the topic. Central message can be deduced, but is not explicitly stated in the presentation.</p>

<b>Communication skills - written</b>	Demonstrates a thorough understanding of context, audience, and purpose that is responsive to the assigned task(s) and focused. Appropriate, relevant, and compelling content illustrates mastery of the subject. Detailed attention to and successful execution of organization, content, presentation, formatting, and stylistic choices. Skillful use of high-quality, credible, relevant sources to develop ideas. Clear, fluent, and virtually error-free.	Demonstrates adequate consideration of context, audience, and purpose and a clear focus on the assigned task(s). Appropriate, relevant, and compelling content explores ideas. Organized. Credible, relevant sources to support ideas. Uses straightforward language that generally conveys meaning to readers. Few errors.	Demonstrates awareness of context, audience, purpose, and to the assigned tasks(s). Appropriate and relevant content develops and explores ideas through most of the work. Basic organization. Use of credible and/or relevant sources to support ideas. Generally conveys meaning, although writing may include some errors.	Demonstrates minimal attention to context, audience, purpose, and to the assigned tasks(s). Uses appropriate and relevant content to develop simple ideas in some parts of the work. Attempts to use a consistent system for basic organization and presentation. Attempts to use sources to support ideas in the writing. Language and errors sometimes impede meaning.
<b>Expertise in Research &amp; Analytical Skills</b>	Work contributes to advancement of science; adds new contribution to science; Student masters necessary skills (e.g. conceptual, statistics, laboratory or field skills, etc.) for comprehensive project completion.	Work adds to database of scientific knowledge by confirming or clarifying previous results; student works with minimal guidance. Student is proficient in skills (e.g. conceptual, statistics, laboratory or field skills, etc.) for project completion.	Work adds to database of knowledge but does not advance science; student completes some tasks independently. Student is proficient in some skills (e.g. conceptual, statistics, laboratory or field skills, etc.) necessary for project completion.	Work does not advance science; work needs supervision and review to proceed.

**Other**

Please include any comments you have regarding assessment of this graduate student's achievement towards student learner outcomes, or in assessment of the HORT graduate student program.

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**Department of Horticulture  
Thesis/Dissertation Defense Performance Assessment Rubric**

Defending Graduate Student \_\_\_\_\_

Major Advisor \_\_\_\_\_

Degree M.S.

Date of defense \_\_\_\_\_

**Student Learning Outcomes**

**Score using HORT Graduate SLO Rubric**

- |  |       |
|--|-------|
| 1. Depth & breadth of discipline related knowledge | _____ |
| 2. Critical thinking                               | _____ |
| 3. Problem solving                                 | _____ |
| 4a. Communication skills – oral                    | _____ |
| 4b. Communication skills – written                 | _____ |
| 5. Expertise in research and analytical skills     | _____ |

**Summary of Findings – Academic Year 2021-22:**

This is the eighth year of using the assessment. There were 3 M.S. graduates in the 2022-23 academic year who completed their M.S. degrees with assessments completed by their committees. Overall average student outcomes fell into the skill level 3-4 range for all of the assessed measures. The students assessed in the critical thinking area in 2022-23 all had an average score between 3 and 4 which means that they have developed critical thinking skills. For all other measures, individual committee member scores ranked students having a skill level of 3 or 4 meaning that all students were proficient with many of the individual scores indicating mastery of the communication etc. This means that they were able to understand and apply key concepts and principles, understand current and relevant literature, able to collect, summarize, and correctly analyze data, demonstrate competency of technical, statistical and/or computer skills relevant to the discipline for discipline related knowledge. In the area of critical thinking skills, students were able to clearly state the problem and make interpretations supported by evidence from literature and research, and make logical conclusions. For problem solving skills, students were able

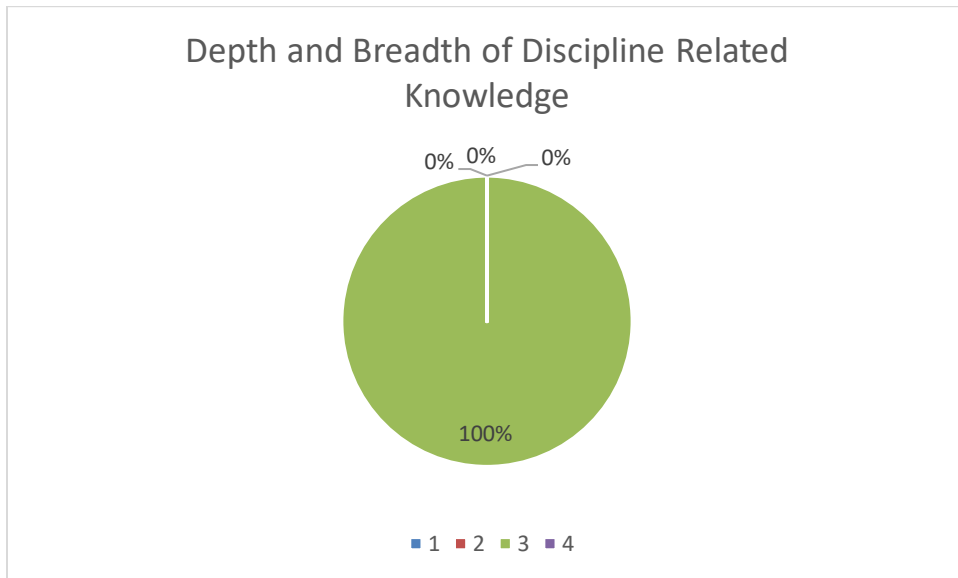


to construct a problem statement with adequate detail and evidence of most relevant contextual factors. They were able to identify multiple approaches for problem solving, comprehend the problem, be sensitive to ethical, logical, historical, and cultural considerations and their evaluation of solutions was adequate, while examining the feasibility of a solution, weighing impacts of the solution, and considering some of the needs for further work. Students' oral communication skills exhibited clear and consistent organization. Students were thoughtful and effective in their presentation, delivering the information at an appropriate level providing supporting reference information and/or analysis that generally supported the presentation, establishing the presenter's credibility. Written communication skills demonstrated adequate consideration of context, audience, and purpose and a clear focus. Information was appropriate, relevant, with compelling content to explore ideas. Students work added to the database of scientific knowledge by confirming or clarifying previous results. Students were proficient or had mastered skills to achieve project completion.

### **Recommendations:**

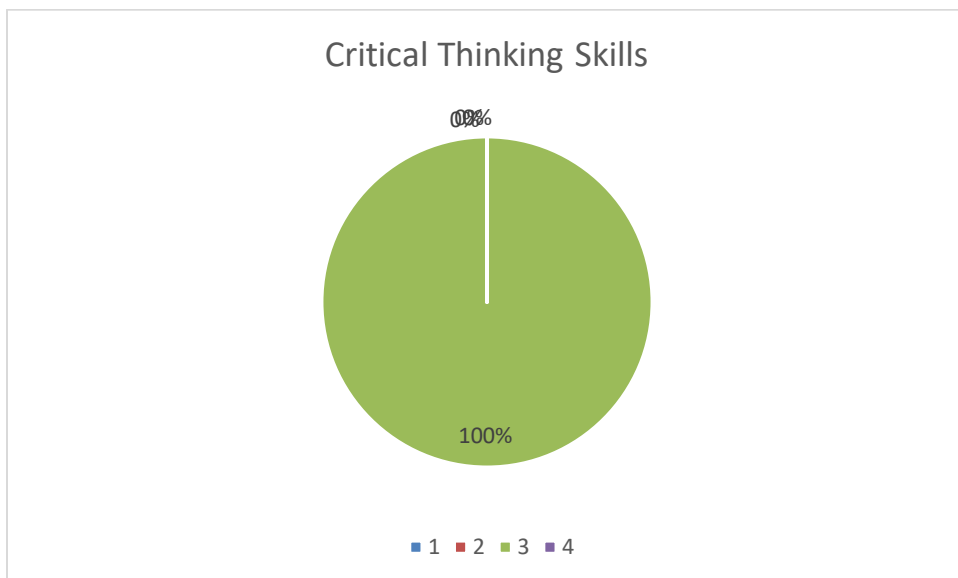
This is the ninth year of collecting data for the assessment with one student's data collected in 2015-16, 6 students' data in 2016-17, three students' data collected in 2017-18, none in 2018-19, two in 2020-21, six in the 2021-22 academic year, and three in 2022-23. Across the years of assessment, the scores have been consistently averaging in the upper half of the skills assessed. As in past years, almost all students receive the highest assessment possible in individual categories (with the exception of critical thinking) but there is no pattern in the data for where they do not attain this level among the students. This indicates the performance of a student who does not reach the highest skill level reflects his or her own strengths and weaknesses versus a weakness in the training and education of the students as a whole. As such, the department will continue to try and create individual learning experiences to expand critical thinking skills and to fill the gaps needed to attain the highest skills possible for the individual.

Figure 1. Discipline related knowledge assessment for graduating M.S. students 2021-22.



Legend Values: Scale of 1 (not prepared, unskilled) to 4 (advanced, mastery of skill). See Thesis/Dissertation Defense Performance Assessment Rubric above.

Figure 2. Critical thinking skills assessment for graduating M.S. students 2021-22.



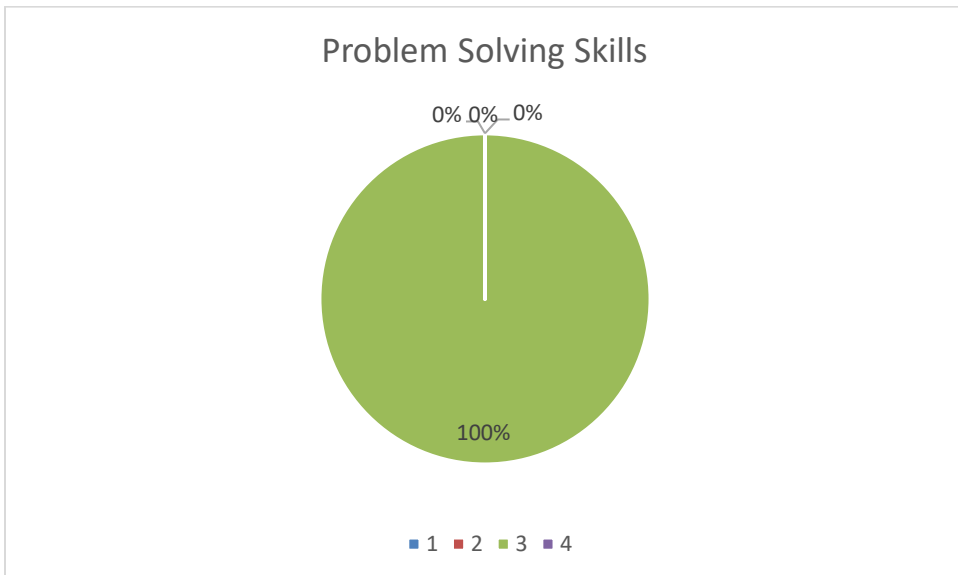
Legend Values: Scale of 1 (not prepared, unskilled) to 4 (advanced, mastery of skill). See Thesis/Dissertation Defense Performance Assessment Rubric above.

Figure 3. Written communication skills assessment for graduating M.S. students 2021-22.



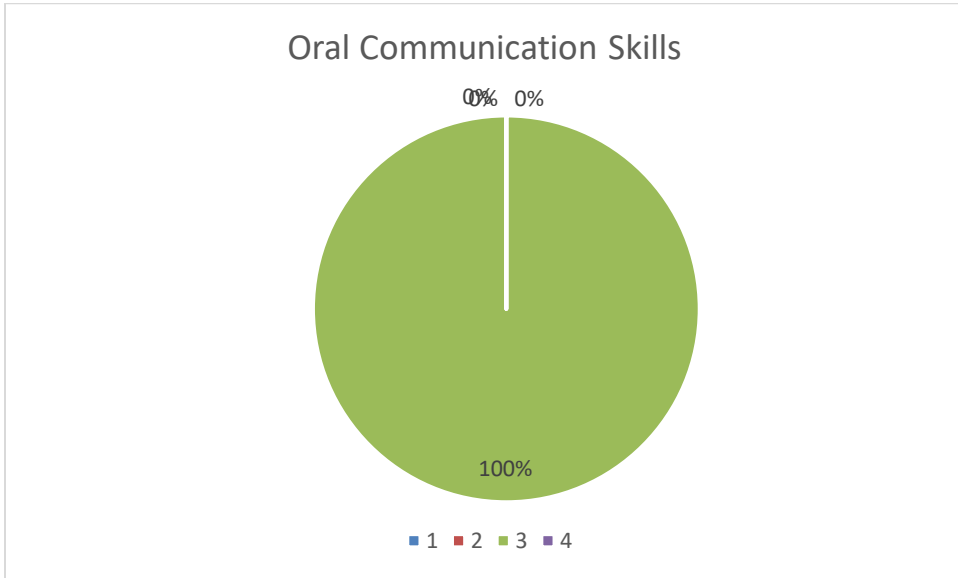
Legend Values: Scale of 1 (not prepared, unskilled) to 4 (advanced, mastery of skill). See Thesis/Dissertation Defense Performance Assessment Rubric above.

Figure 4. Problem solving skills assessment for graduating M.S. students 2021-22.



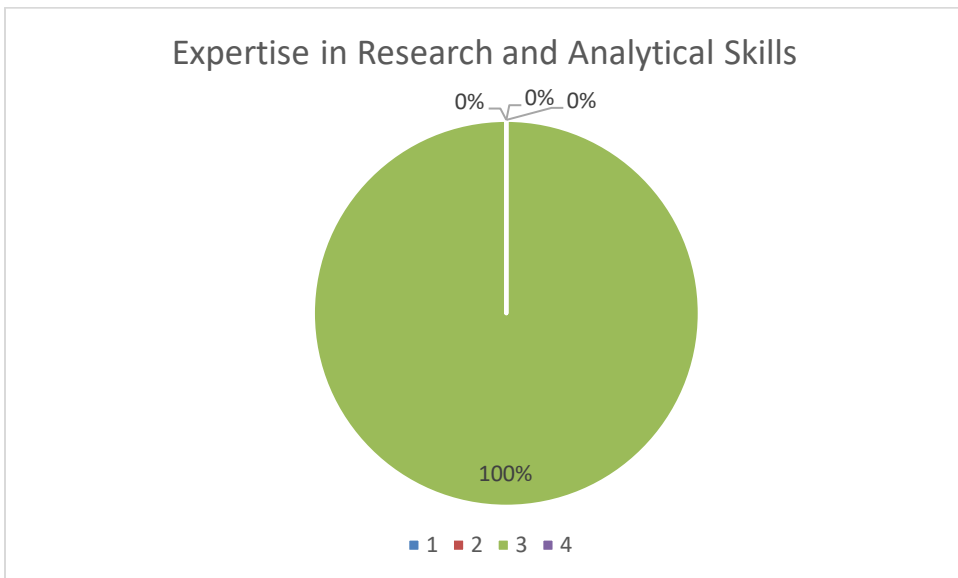
Legend Values: Scale of 1 (not prepared, unskilled) to 4 (advanced, mastery of skill). See Thesis/Dissertation Defense Performance Assessment Rubric above.

Figure 5. Oral communication skills assessment for graduating M.S. students 2021-22.



Legend Values: Scale of 1 (not prepared, unskilled) to 4 (advanced, mastery of skill). See Thesis/Dissertation Defense Performance Assessment Rubric above.

Figure 6. Research and analytical skills assessment for graduating M.S. students 2021-22.



Legend Values: Scale of 1 (not prepared, unskilled) to 4 (advanced, mastery of skill). See Thesis/Dissertation Defense Performance Assessment Rubric above.