

APPENDIX: WSE FOUNDATIONAL ABILITIES RUBRICS

WSE Foundational Abilities Master Rubric

Foundational Abilities Master Rubric		
Nascent	Proficient	Advanced
<ul style="list-style-type: none">• Demonstrating, at best, basic knowledge and skills.• Student should focus on additional practice and opportunities for learning.• Actionable feedback is provided to identify areas for potential growth.• <i>This level is <u>insufficient</u> to fulfill FA graduation requirements.</i>	<ul style="list-style-type: none">• Performing at the level expected of an entry-level professional.• Meets the requirements of the program.• <i>This level is sufficient to fulfill FA graduation requirements.</i>	<ul style="list-style-type: none">• Performing at the level of a working professional in the field.• Surpasses requirements of the program.• Shows promise for significant accomplishment in the application of this foundational ability.• <i>This level is sufficient to fulfill FA graduation requirements.</i>

Resource: <https://www.aacu.org/initiatives/value-initiative/value-rubrics>

FA1: Writing and Oral Communication

Students should recognize the importance of language and have a command of it as readers, writers, and speakers.

Learning Objectives

- Students will demonstrate the ability to communicate effectively in different modes including, but not limited to, written and oral forms.
- Students will demonstrate the ability to adapt to varied audiences and purposes.
- Students will demonstrate the ability to understand, interpret, and respond to the communications of others.

Minimal needs for writing (FA1.1) work assessed:

- All categories must be proficient for the student to satisfy the graduation requirement.
- Students must provide a substantive writing sample that meets at least one of the following criteria:
 - a report/essay/deliverable of at least 3-5 pages
 - a 1-2 page “high stakes” assignment that foregrounds a student’s understanding of concepts crucial to the field, or
 - a thoughtful, germane reflection about learning that had occurred during the course, or
 - a department-specific alternate specification approved by the department’s undergraduate curriculum committee.
- Written work that has been produced collaboratively can meet the minimum requirements for “substantive writing” (as defined above) for the individual student; it is recommended that such submissions include a reflective component produced individually by the student.

Minimal needs for oral communication (FA1.2) work assessed:

- Message, Audience, and Delivery must be deemed at least “proficient” for the student to satisfy the graduation requirement. Materials may also need to be assessed as proficient at the discretion of the assessor.
- An individual presentation on a topic relevant within an engineering, computing, or mathematical context.
- For collaborative presentations, each student should be responsible for an equal portion of the of the preparation of material and spoken content during the presentation.
- A recording of the presentation must be uploaded to the ePortfolio; this recording **may or may not** be of the live graded in-class presentation.

Foundational Abilities Rubric: Writing (FA1.1)

	Nascent	Proficient	Advanced
MESSAGE (REQUIRED)	The overall message is insufficiently clear, germane, and/or effective	Contains an overall message that is clear and germane but may still need some finessing to be effective	Contains a very clear, germane, concise, and effective message
AUDIENCE (REQUIRED)	Demonstrates limited awareness and sensitivity towards audience; possibly lacking in nuance, persuasiveness, or professionalism	Embodies an awareness of and sensitivity toward its audience, but could be more nuanced, persuasive, or professional	Demonstrates strong awareness and sensitivity towards audience; approach is nuanced, persuasive, and professional
CONTEXT (REQUIRED)	Displays limited critical thinking and/or inadequately frames the issue; background may be insufficiently presented and/or the ideas disconnected	Thinks critically and frames the issue competently, but misses subtleties; provides sufficient background; ideas are linked, but connections are tenuous in some instances	Thinks cogently and incisively about the central issue; frames the issue competently; provides all the necessary background and connects ideas together skillfully
STYLE (REQUIRED)	Prose is difficult to read and/or parse; this may be due to excessive use of passive voice, jargon-laden phrasing, and/or lack of fluency in English	Prose is readable but may be inelegant; the reader may have to read more than once to understand; may contain an awkward amount of passive voice	Prose is easy to read; the reader needs to exert very little effort to understand the content; contains a skillful ratio of active to passive voice
GRAMMAR (REQUIRED)	Text is difficult for the reader to comprehend due to problematic grammar and/or typographical errors	Contains minor grammar errors and/or typographical errors but they do not impede reader from understanding	Contains no grammar errors and/or typographical errors; prose is polished and professional

Foundational Abilities Rubric: Oral Communications (FA1.2)

	Nascent	Proficient	Advanced
MESSAGE (REQUIRED)	Presentation's overall message is insufficiently clear, germane, and/or effective	An organized presentation that contains an overall message that is clear, germane, and professional but may still need some finessing to be completely effective	A compelling, well-organized presentation that contains a very clear, professional, germane, concise, and effective message
AUDIENCE (REQUIRED)	Displays limited awareness and sensitivity towards audience, requires more nuance, persuasiveness, and/or professionalism	Embodies an awareness of and sensitivity toward its audience but could be more nuanced, persuasive, or professional	Demonstrates strong awareness and sensitivity towards audience; approach is nuanced, persuasive, and professional
DELIVERY (REQUIRED)	Delivery has deficiencies which could include a lack of confidence, preparation, sensitivity and/or linguistic fluency	Delivery is competent but could be more effective, professional, or polished; presenter relies heavily on reading slides; presenter has sufficient confidence to present but could be stronger; presenter can be understood but may need more organization, finesse, and nuance to be persuasive	Delivery is persuasive, professional, and effective; presenter has an excellent level of preparation, which allows eye contact and connection with the audience; presenter has excellent language skills, confidence, and credibility
MATERIALS (OPTIONAL)	Materials are inadequately organized and visually appealing, miss key ideas, lack data visualizations, and/or references/citations; insufficient attention to copyright issues	Materials are organized but may not be visually appealing; features data visualizations where appropriate, but may contain excessive text or information for the audience to digest	Materials are audience-friendly, well-designed, visually compelling, and easy to understand; they complement the speaker's presentation; data visualizations, where appropriate, are clear and easy to interpret

FA2: Scientific and Quantitative Reasoning

Students should develop facility with scientific, numerical, and algorithmic reasoning and be able to use computational and analytical methods.

learning objectives

- Students will demonstrate the ability to reason scientifically and quantitatively.
- Students will show the ability to construct and evaluate arguments and hypotheses supported by data, sound theory, and evidence.

Note: FA2 is fulfilled by achieving a passing grade in coursework. However, faculty may utilize ePortfolios to assess coursework in advanced courses. Additionally, students are encouraged to engage in Customized Academic Learning (CAL) in their ePortfolio to document and assess research and independent work.

Minimal needs for scientific and quantitative reasoning work assessed:

- Must address a substantial problem using scientific, numerical and/or algorithmic reasoning.
- Must effectively deploy computational and/or analytical methods.
- Explains and justifies analysis and conclusions.
- The student must be assessed on knowledge and explication and one or both of analysis and application.

Foundational Abilities Rubric: Scientific and Quantitative Reasoning (FA2)

	Nascent	Proficient	Advanced
KNOWLEDGE (REQUIRED)	Demonstrates, at most, basic knowledge of engineering, computing, science and/or math topics; may be lacking in one or more areas of knowledge relevant to the endeavor	Demonstrates substantial knowledge of engineering, computing, science and/or math subjects relevant to the endeavor	Demonstrates comprehensive knowledge of engineering, computing, science and math subject areas relevant to the endeavor; Can engage discussions regarding the knowledge gap in the related specialized disciplines
ANALYSIS (REQUIRED)	Limited ability to analyze a problem based on existing knowledge; encounters difficulty, particularly in specialized areas or complex analyses.	Engages in self-directed study in areas of engineering, computing, science and/or math including a review of the relevant literature; applies quantitative reasoning skills, i.e. data analysis, mathematical modeling, algorithm development, or numerical analysis.	Conducts novel research in engineering, computing, science and/or math at the level expected of a beginning graduate student; successfully applies data analysis, mathematical modeling, algorithm development, or numerical analysis toward the solution of a problem.
APPLICATION (REQUIRED)	Limited ability to apply principles and techniques in a practical context; encounters difficulty, particularly in specialized areas or complex applications; demonstrates basic level of facility in methods appropriate for the discipline.	Applies prototyping, design, laboratory and/or computational skills, and other techniques appropriate to the discipline to solve problems in engineering, computing, science, and/or mathematics at the level of an entry-level professional.	Applies prototyping, design, laboratory and/or computational skills, and other techniques appropriate to the discipline to solve problems in engineering, computing, science, and/or mathematics at the level of a working professional.
EXPLANATION (REQUIRED)	Limited ability to explain problems and detail their proposed explanations or solutions; misses some relevant details or nuances.	Can clearly formulate questions in areas of engineering, science, and/or math; able to detail investigations, findings, and conclusions considering the limits of their approaches and the uncertainty of their methods.	Can formulate questions in areas of engineering, science, and/or math with exceptional clarity. Derives convincing insights from their investigations, findings, and conclusions considering the limits of their approaches and the uncertainty of their methods.

FA3: Creative Expression

Students should recognize the importance of complex creative expressions and cultivate their intellectual and emotional responses to aesthetic and cultural experiences.

learning objectives

- Students will demonstrate the ability to interpret complex creative expressions, in some cases by undertaking such endeavors themselves.
- Students will demonstrate the ability to articulate the cultural, historical, and contemporary contexts of these works along with their social and cultural implications.

Note: FA3 is fulfilled by achieving a passing grade in coursework. However, faculty may utilize ePortfolios to assess coursework in advanced courses. Additionally, students are encouraged to engage in CAL in their ePortfolio to document and assess research and independent work.

Minimal needs for work assessed:

- If the work in question is the students' own, the ePortfolio should include one or more of the following:
 - A recording of a public performance either by the student or to which the student has contributed substantially, e.g. via music composition, directing, or other crucial aspects of its production.
 - A collection of student-created artwork documented as high-quality digital media.
 - A substantial work of literature or collection of poetry
 - Evidence of other substantial creative endeavors with significant aesthetic components requiring extensive preparation and refinement for their successful execution.
- An interpretation of aesthetic work (the student's or that of another) in writing or via a recorded oral presentation that meets the minimum specifications for FA1.1 or FA1.2.

Foundational Abilities Rubric: Creative Expression (FA3)

	Nascent	Proficient	Advanced
ARTISTIC EXPRESSION ↑	Demonstrates some facility with the skills necessary for expression in the literary, performing, decorative, or fine arts	Demonstrates achievement in the literary, performing, decorative, or fine arts by the production of works of high quality; reflects upon the meaning and context of this work.	Demonstrates recognized achievement in the literary, performing, decorative, or fine arts by the production of works of superior quality; reflects upon the meaning and context of this work in ways that provide uncommon insight.
ANALYTIC RESPONSE	Creatively responds to aesthetic and cultural experiences in ways that foster a deeper appreciation for creative works, but which are lacking in nuance and/or connection to the critical literature.	Creatively responds to aesthetic and cultural experiences in ways that foster a deeper appreciation for creative works and connect to the body of critical thinking regarding such works.	Develops novel and insightful responses to aesthetic and cultural experiences in ways that foster a deeper appreciation for creative works and contribute to the body of critical thinking regarding such works.
CONTEXTS	Uses historical, critical, conceptual, interpretive, and/or theoretical frameworks to analyze creative works in ways that are partial or incomplete.	Deploys historical, critical and theoretical frameworks to analyze creative works in ways that foster a deeper appreciation of their production and meaning.	Deploys historical, critical and theoretical frameworks to derive deeper meanings from creative works and shed light on their production and deployment.
CULTURES	Engages with the role of translation and adaptation in conveying creative works across languages and cultures in ways that are incompletely developed.	Engages insightfully with the role of translation and adaptation in conveying creative works across languages and cultures.	Generates considerable insight regarding the role of translation and adaptation and in the process convey creative works across languages and cultures.
CONNECTIONS ↓	Draws connections between texts, objects/artifacts, genres, artistic movements, aesthetic criteria, and/or other relevant conceptual frameworks that are partial and in need of further development.	Draws connections between texts, objects/artifacts, genres, artistic movements, aesthetic criteria, and/or other relevant conceptual frameworks that are clear and well-informed.	Draws substantial connections between texts, objects/artifacts, genres, artistic movements, aesthetic criteria, and/or other relevant conceptual frameworks that are nuanced and insightful.

FA4: Engagement with Society

Students should engage effectively as citizens of a multifaceted world informed by an understanding of historical and social determinants.

learning objectives

- Students will demonstrate the ability to engage effectively and thoughtfully with societies in which they live and work and with people of different cultures, backgrounds, and values.
- Students will demonstrate the ability to understand how history and current events inform efforts to make societies humane and just.

Note: FA4 is fulfilled by achieving a passing grade in coursework. However, faculty may utilize ePortfolios to assess coursework in advanced courses. Additionally, students are encouraged to engage in CAL in their ePortfolio to document and assess research and independent work.

Minimal needs for work assessed:

- A project performed over at least one semester under a faculty member's mentorship during which regular reflective meetings occurred at weekly or bi-weekly intervals, and which resulted in a written manuscript of not less than 10 pages.
- Assessment at the level of proficient in one or more of the enumerated categories in the rubric.

Foundational Abilities Rubric: Engagement with Society (FA4)

	Nascent	Proficient	Advanced
HUMAN SOCIETY	Exhibits partial understanding regarding local, national, regional, and/or global societies now or in human history.	Demonstrates knowledge about local, national, regional, and/or global societies now or in history and an ability to explain their organizational principles.	Demonstrates knowledge about local, national, regional, and/or global societies now or in history; derives insights regarding their organization.
CIVIC LIFE	Exhibits some knowledge, skills, and ability to foster dialogue, cultivate civic engagement and political participation, and strengthen inclusive processes and institutions.	Demonstrates the knowledge, skills, and ability necessary to foster dialogue, cultivate civic engagement and political participation, and strengthen inclusive processes and institutions in an impactful manner.	Has fostered dialogue, cultivated civic engagement and political participation, and/or strengthened inclusive processes and institutions in an impactful manner and has reflected on the experience.
DEMOCRATIC INSTITUTIONS	Exhibits an incomplete understanding of democratic institutions and principles of political representation; the rule of law; and state sovereignty.	Demonstrates a functional understanding of democratic institutions and principles of political representation; the rule of law; and state sovereignty. Able to identify and evaluate factors that undermine democratic governance.	Has engaged democratic institutions, systems of political representation, the law and/or (non-/inter-) governmental bodies in an impactful manner and has reflected on the experience.
LANGUAGE SKILLS (ONLY ONE REQUIRED)	Exhibits some proficiency in a language other than English or their native language.	Demonstrates ability to communicate effectively with others in a language other than English or their native language.	Engaged in a language other than English or their native language in ways that demonstrate fluency and impact and has reflected on the experience.
HISTORICAL PERSPECTIVE	Exhibits some historically informed perspectives on issues related to the challenges facing human societies.	Demonstrates an ability to formulate historically informed perspectives on issues related to the challenges facing human societies. Able to relate events and policies that have contributed to challenges and disparities.	Demonstrates an ability to formulate historically informed perspectives on issues related to the challenges facing human societies. Derives insights regarding events that have contributed to challenges and disparities.
HUMAN FUTURES	Considers how opportunities and challenges facing humanity, including inequity, inequality, bigotry, prejudice, and/or racism, manifest in different contexts and affect individuals and communities.	Demonstrates an ability to analyze potential solutions and strategies to address opportunities and challenges facing humanity including inequity, inequality, bigotry, prejudice, and/or racism.	Has worked toward solutions and that address opportunities and challenges facing humanity including inequity, inequality, bigotry, prejudice, and/or racism; has reflected on the experience.

FA5: Ethical Reflection

Students should be reflective, effective ethical agents.

Learning objectives:

- Students will demonstrate the ability to understand, analyze, reflect, and act with ethical agency in their personal and professional lives by exploring various perspectives along ethical, moral, and social dimensions and applying these considerations to their decision-making.
- Students will understand their obligations as engineers.

Minimal needs for work assessed:

- Assignment can be any format
- Must address at least one dimension of ethical considerations and impacts
- Requires framing, interpreting, and situating of a relevant ethical problem/challenge/concept
- The ethical analysis should demonstrate at least “proficiency” in each of the following abilities: considering multiple ethical considerations, proposing a plan of action, providing a rationale for the proposed plan of action, understanding various stakeholders’ perspectives, and projecting future consequences

Foundational Abilities Rubric: Ethical Reflection (FA5)

	Nascent	Proficient	Advanced
PROPOSAL (REQUIRED)	Proposed course of action requires more work or effort to be clear, competent, or appropriate.	Contains a proposed course of action that is clear and germane but will likely be ineffective or unsatisfactory in practice	Contains a very clear, germane, concise, and effective course of action
PERSPECTIVE (REQUIRED)	Analysis requires more perspectives, points of view, or stakeholder analysis to be professional.	Can conceptualize different points of view and stakeholders but could push further; embodies sensitivity and awareness but could be more nuanced, persuasive, or professional	Demonstrates strong awareness and sensitivity towards a wide range of stakeholders and their needs; approach is highly nuanced, persuasive, and professional
CONTEXT (REQUIRED)	The analysis needs more work, background, and/or justification to frame the ethical issue competently.	Thinks critically and frames the ethical issue competently; but misses some implications; provides sufficient background and ideas are grounded but requires more points of connection	Thinks cogently and incisively about the ethical issue; frames the ethical issue in a competent way; provides comprehensive background and connects ideas together skillfully
RATIONALE (REQUIRED)	The analysis needs a more competent, stakeholder-friendly, clearer, or appropriate rationale	Contains a clear, germane rationale but one that is likely to require additional finesse and clearer justification to be effective	Contains a very clear, germane, concise, and effective rationale that is persuasive, professional, and stakeholder-sensitive
IMPACT (REQUIRED)	The analysis needs more work to predict future consequences more clearly, to consider stakeholder impact more effectively, or to be more professional.	Predicts future consequences effectively, but neglects to consider additional eventualities and their impact on stakeholders that may be crucial to assure effectiveness; assessments could be more nuanced	Predicts future consequences in a nuanced, persuasive and comprehensive way; understands how projections affect various stakeholders differently

FA6: Conceiving of and Realizing Projects

Students should be able to independently conceptualize and complete large-scale, consequential projects.

learning objectives

- Students will demonstrate the ability to conceptualize, develop, and deliver consequential projects with ambitious scope, individually or in collaborative teams.

Minimal needs for work assessed:

- Projects should engage the use of and growth in a technical skill.
- Teamwork on the project is permitted, but in such cases individual contribution must be explicitly addressed in a student reflection regarding the student's individual contribution to the team project.
- Each project must be designed to permit the assessment of ideation, implementation, reflection, and project management as defined below:
 - Ideation: consideration of the context of the problem and the possible approaches towards its solution
 - Implementation: completion of steps toward the implementation of the solution
 - Reflection: evaluation of the results at least once with an eye toward improvement
 - Project management: demonstration of appropriate goal setting, and, where group work is involved, appropriate assessment of individuals' efforts and attention to the assignment of roles and management of conflicts.

Foundational Abilities Rubric: Conceiving of and Realizing Projects (FA6)

	Nascent	Proficient	Advanced
IDEATION (REQUIRED)	Identifies at least one problem or solution approach but the problem definition and/or solution proposals are not sufficiently informed by context, require further explication and/or are lacking in key details.	Identifies at least one problem and one or more proposed solutions that are directly applicable to context; provides a discussion of the contextual issues but may require additional details or explanation to achieve clarity.	Identifies at least one problem and multiple proposed solutions that are directly applicable to context; provides a clear and compelling discussion of the contextual issues.
IMPLEMENTATION (REQUIRED)	Reasoning for the work performed requires additional clarifying detail to establish the logic/reasoning for the steps; the project is incomplete or fails to meet any of the initial goals.	Sufficient background information with adequate logic and reasoning is provided for all project steps; implementation of the project is complete and meets most of the initial goals.	Complete background information with compelling logic and reasoning is provided for all project steps; implementation of the project is complete and meets or exceeds all the initial goals.
REFLECTION (REQUIRED)	Demonstrates inadequate understanding of the limitations of the outcome of the project; Additional critical assessment is needed to inform improvement or further development of the project.	Demonstrates sufficient understanding of the limitations of the project outcomes; reflections demonstrate critical thinking with clear recommendations for future improvements.	Demonstrates a clear and insightful understanding of the limitations of the project outcomes; reflections demonstrate critical thinking with actionable recommendations for improvements; iterations on the project were undertaken that lead to significant improvements in the execution.
PROJECT MANAGEMENT (REQUIRED)	The project was not managed with clear goals and milestones; one or more aspect remains incomplete. For group work: Performed ineffectively as a team; conflicts were inadequately addressed; individual members did not contribute to their assigned tasks; some members performed most of the tasks.	The project was managed with clear goals and milestones; the project was completed on time. For group work: Performed effectively as a team; addressed conflicts as they arose; individual members contributed to assigned tasks.	The project was managed with clear goals and milestones; all sub-goals were completed on time or were accounted for by adjusting the plan; the project was completed successfully and on time. For group work: Performed excellently as a team without substantial conflict; individual members not only contribute to assigned tasks but also generated ideas and made critical decisions collaboratively.