**OHSU – Biomedical Informatics Graduate Program - Core Competencies for PhD in Health and Clinical Informatics**

**Intended Use**: This rubric is meant to be a guide for students and their advisors and mentors to help track their progress through the HCIN PhD degree program. Measurements are a suggestion – feel free to add as you see fit!

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| **Professional Knowledge and Skills** | **Meets expectations** | **Does not meet expectations** | **Possible Measurements** |
| SLO: * Apply a broad knowledge of health and clinical informatics, and related disciplines, to solve problems in research, clinical and educational settings.
 |
|  | Advanced understanding of the knowledge base related to biomedical informatics | Basic knowledge base related to biomedical informatics | * Present a symposium on their research topic
* Student initial presentation of dissertation proposal
* DAC (Dissertation Advisory Committee) meetings – reports
* Research rotations
* Course Midterms
* Course Finals
* Passing other larger course projects
* Successful defense of dissertation
* Submission of dissertation
 |
| Knowledge base |
| Advancements | An in depth understanding of the advancements in biomedical informatics | Basic or lack of understanding of the advancements in biomedical informatics |
| Specialization | Advanced knowledge of one specialization in biomedical informatics | Poor or basic knowledge of one specialization in biomedical informatics |
| Development of new knowledge | Develops new knowledge in their specialized field | Incomplete or lack of development of new knowledge in their specialized field |
| **Reasoning and Judgement** | **Meets expectations** | **Does not meet expectations** | **Possible Measurements** |
| SLO: * Identify gaps in scientific knowledge; formulate a research question; design a research study; employ and apply appropriate methods or develop new methods as necessary; analyze, contextualize, and interpret results; and evaluate the internal and external validity of the research findings.
 |
| Critical thinking | Viewpoints presented in the scientific literature are critically analyzed to identify gaps in the research | Viewpoints presented in the scientific literature are not critically analyzed to identify gaps in the research | * Present a symposium on their research topic
* Student initial presentation of dissertation proposal
* DAC (Dissertation Advisory Committee) meetings – reports
* Research rotations
* Course Midterms
* Course Finals
* Passing other larger course projects
* Successful defense of dissertation
* Submission of dissertation
* Possible course alignment: BMI 660, BMI 661, BSTA 525
* Course: Quantitative Research Methods
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|  | Research question is stated clearly and described comprehensively, delivering all relevant information necessary for full understanding | Research question is stated without clarification or description, or is otherwise unclear. |
| Research methods | Applies appropriate methods or develops new methods as necessary | Does not apply appropriate methods or does not develop new methods when necessary |
| Critical analysis | Research results are evaluated, including whether results were internally and externally validated. | Research results are not evaluated. Validity of results is not mentioned or is unclear.  |
|  | Conclusion is based on an in-depth synthesis and analysis of the data, even if hypothesis is disproven. | Conclusion is based on an incomplete synthesis and analysis of the data. |
| **Evidence-based Practice and Research** | **Meets expectations** | **Does not meet expectations** | **Possible Measurements** |
| SLO:* Identify and define problems, critically compare options, make timely decisions or recommendations, identify uncertainties, and use findings to improve outcomes in light of evolving evidence.
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| Literature review | Critical review of the relevant scientific literature | Basic or missing review of the relevant scientific literature | * Present a symposium on their research topic
* Student initial presentation of dissertation proposal
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* Research rotations
* Course Midterms
* Course Finals
* Passing other larger course projects
* Successful defense of dissertation
* Submission of dissertation
* Course: Quantitative Research Methods
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| Research advancement | Substantial critical evaluation of recent advancements in the field of research | Some or no critical evaluation of recent advancements in the field of research |
| Research objectives | Systematic approach to address research objectives | Incomplete/disorganized approach to address research objectives |
| Research results | Research results are presented comprehensively | Research results are not presented comprehensively |
| Recommendations for further research | Possible future directions of research are clearly presented | Possible future directions of research are unclear. |
| **Lifelong Learning** | **Meets expectations** | **Does not meet expectations** | **Possible Measurements** |
| SLO: * Engage in lifelong learning through: finding, interpreting and critically appraising scientific literature in order to fill knowledge gaps and stay informed of scientific advances; synthesizing and applying new knowledge to their own research; and connecting with the larger scientific community through participating in scientific conferences and societies.
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| Local/Regional conference participation | Presenting at local/regional conference | Attending Thursday research conference | * Includes Thursday conference, OHSU research week, BioData Club, etc.
* NLM trainees attend annual NLM trainee meeting
* Attend other meeting as allowed
* Attend conferences as interested
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| National/International conference participation | Presenting at national/international research conference | Does not present at national/international research conference |
| Networking | Attend outside conferences to fill knowledge gaps and meet possible future collaborators | Does not attend outside conferences to fill knowledge gaps and meet possible future collaborators |
| **Communication** | **Meets expectations** | **Does not meet expectations** | **Possible Measurements** |
| SLOs: * Effectively communicate and disseminate scientific research in written and verbal form to both peers and non-experts.
* Communicate professionally, including during interactions with others, and while giving and receiving feedback.
 |
| Writing skills | Well written dissertation and organization supports the objectives. Content is clear and coherent. | Poorly written and poorly organized, content unclear, lapses in coherence | * Present a symposium on their research topic
* Student initial presentation of dissertation proposal
* DAC (Dissertation Advisory Committee) meetings – reports
* Research rotations
* Course Midterms
* Course Finals
* Passing other larger course projects
* Successful defense of dissertation
* Submission of dissertation
* Glossary of terms is recommended at final presentation defense for non-experts
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| Speaking skills | Spoken explanations are complete, clear and concise  | Spoken explanations are not complete, clear and/or concise |
| Audience awareness | Audience knowledge was considered in presentation of topic | Audience knowledge was not considered in presentation of topic |
| Response to feedback | Actively listens and responds appropriately and respectfully to feedback | Responds inappropriately and/or disrespectfully to feedback |
| Integrating feedback | Documents and addresses feedback; seek out opportunities for feedback | Does not document or address feedback; does not seek out opportunities for feedback |
| Respect for others | Interacts respectfully with all peers, faculty, and staff | Does not interact respectfully with all peers, faculty and staff |  |
| **Professionalism and Ethics** | **Meets expectations** | **Does not meet expectations** | **Possible Measurements** |
| SLO: * Apply fundamental knowledge of ethics in research and implement solutions that assure confidentiality, security and integrity while maximizing the availability of data, information, and knowledge.
 |
| Academic integrity/Research ethics | Current principles of ethics and academic integrity are incorporated into all aspects of research. | Lack of awareness, or lack of application, of current principles of academic integrity and research ethics | * Student initial presentation of dissertation proposal
* DAC (Dissertation Advisory Committee) meetings – reports
* Research rotations
* Course Midterms
* Course Finals
* Passing other larger course projects
* Successful defense of dissertation
* Submission of dissertation
* Possible course alignment: BMI 624, BMI 640, BMI 644, BMI 646, BMI 648, BMI 676, HIP courses
* Course Midterms
* Course Finals
* Passing other larger course projects
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| Manage data  | Record data in prescribed format in timely, accurate and complete manner. | Record experimental results with flaws in timeliness, accuracy and organization |
| Data security | Conform to current standards of data security as determined by University policy and practice | Does not conform to current standards of data security as determined by University policy and practice |  |
| **Interprofessional Teamwork** | **Meets expectations** | **Does not meet expectations** | **Possible Measurements** |
| SLO: * Function as a productive member of a multidisciplinary collaborative team of informatics, information technology, clinical, administrative, and other experts.
 |
| Teamwork | Works professionally, collegially and effectively as team member/collaborator | Does not work professionally, collegially and/or effectively as team member/collaborator | * Student initial presentation of dissertation proposal
* Annual Review
* DAC (Dissertation Advisory Committee) meetings – reports
* Research rotations
* Successful defense of dissertation
* Submission of dissertation
* Possible course alignment: BMI 617, BMI 618, BMI 619
* Course Midterms
* Course Finals
* Passing other larger course projects
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| **Safety and Quality Improvement** | **Meets expectations** | **Does not meet expectations** | **Possible Measurements** |
| SLO: * Demonstrate and promote informatics solutions that help to ensure patient safety within relevant clinical settings.
 |
| Safety Standards | Complies with safety and regulatory standards | Does not comply with safety and regulatory standards | * Research rotations
* Possible course alignment: BMI 612, BMI 676
* Passing other larger course projects
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| **Systems** | **Meets expectations** | **Does not meet expectations** | **Possible Measurements** |
| * Appraise applicable informatics concepts, methods, and tools to solve challenging health informatics problems in their focus area.
* Solve complex health and health information problems by applying the principles of team science to the scope of practice and roles of different stakeholders (including health care professionals, researchers, and patients).
* Have experience and training utilizing modern frameworks for rapid prototyping, and how to extract information from a wide variety of databases, as relevant.
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| Critical Thinking | Able to evaluate relevant concepts, methods and tools within their focus area | Unable to evaluate relevant concepts, methods and tools within their focus area, or evaluation not presented | * Student initial presentation of dissertation proposal
* Annual Review
* DAC (Dissertation Advisory Committee) meetings – reports
* Successful defense of dissertation
* Submission of dissertation
* Research rotations
* Course Midterms
* Course Finals
* Passing other larger course projects
* Organizational Behavior Course Assignments
* Project management course assignments
* Internships
* Possible course alignment: BMI 617
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| Priorities | Able to integrate stakeholder priorities into solutions to complex health and health information problems | Unable to integrate stakeholder priorities into solutions to complex health and health information problems |
| **Social Justice** | **Meets expectations** | **Does not meet expectations** | **Possible Measurements** |
| SLO: * Integrate the culture and diversity of a population when developing research ideas, conducting research, evaluating implementation, and/or interpreting research findings.
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| Empathy toward others | Demonstrates empathy toward the culture and diversity of all stakeholders | Treats others with respect; follows standard practices | * Student initial presentation of dissertation proposal
* Annual Review
* DAC (Dissertation Advisory Committee) meetings – reports
* Successful defense of dissertation
* Submission of dissertation
* Research rotations
* Course Midterms
* Course Finals
* Passing other larger course projects
* Internships
* Possible course alignment: BMI 617, BMI 676
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Adapted from: Western University, Ontario, Canada: Learning Outcomes: Evolution of Assessment and Van Andel Institute