University of Rochester Ph.D. Degree Program Assessment Plan

A.   Program title: Mechanical Engineering

B.   Program degree: PhD

C.   Program objectives and program learning outcomes:

Program objective 1. Program will prepare students to contribute as original and creative research scholars in their field

> <u>Core knowledge, methods, and scholarship</u>: Students will demonstrate comprehensive knowledge of the theories, methods, and scholarship in the field
> <u>Specialization knowledge, methods, and scholarship:</u> Students will demonstrate comprehensive, in depth knowledge of the theories, methods and scholarship within their research specialization area(s)
> <u>Creative synthesis/ Critical thinking</u>: Students will be able to critically analyze existing works in the field. Students will creatively synthesize broad areas of theory and scholarship in generation of new ideas or insights
> <u>Research/ Methods</u>: Students will conduct skillful research including gathering, processing, and interpreting data. Students will make considered choices in design of a research study. Students will precisely implement methods of analysis or investigation as part of research projects
> <u>Scholarship</u>: Students will produce original, scholarly contributions in their field

Program objective 2. Program will prepare students as successful professionals in their field

> <u>Written communication</u>: Students will convey ideas or arguments in clear, concise, well organized papers
> <u>Oral communication</u>: Students will convey ideas in cogent, persuasive, and organized presentations
> <u>Professional ethics</u>: Students will demonstrate a responsible, ethical manner in professional work
> <u>Teamwork</u>: Students will demonstrate ability to work with others on projects, including sharing work involved in development of initial ideas and project plan, discussion of progress, and completion of work

Program objective 3. Program will prepare students to hold positions of leadership in academic, government, non-profit and industry organizations

> <u>Leadership</u>: Students will demonstrate leadership through positions held in scholarly and other professional activities

Program objective 4. Program will prepare students as effective teachers

> Teaching: Students will present well-organized lectures, classroom activities and assignments that support undergraduate student learning

D. Program assessment methods - direct methods and review plan

The following methods will be implemented annually and for each doctoral degree candidate. Test results and faculty review forms for each method will be gathered in student file:

1- Core course grades will be reviewed annually. Student will be placed on warning if grade of C or below.
2- Preliminary exam (written). Taken at end of first year, test sections written by faculty and student responses reviewed by faculty responsible for each section.
3- Doctoral qualifying exam (research proposal) at end of third year. Written research proposal and oral presentation will be reviewed by faculty.
4- Doctoral dissertation, written form, will be reviewed by faculty committee using the Doctoral Dissertation Defense Review Form. Data from review forms will be tabulated and reviewed by faculty committee periodically.
5- Doctoral dissertation, oral defense, will be reviewed by faculty using the Doctoral Dissertation Defense Review Form. Data from review forms will be tabulated and reviewed by faculty committee periodically.
6- Awards, fellowships and other distinctions given by the program, University of Rochester, or external organizations – data will be gathered periodically
7- Refereed journal and conference publications - reported by graduate student to program. Data gathered and reviewed periodically.

E. Program assessment methods - indirect methods

The following indirect methods will be implemented as noted:

1- Graduating Student Survey will be a web-based survey distributed annually by the UR College Director of Assessment. The survey will also include questions that ask students to rate program quality and factors related to learning for communication, leadership, research and teaching.
2- Post-graduation career data - reported by students in above survey. Data will be reviewed periodically by faculty.

F. Program assessment data review

1. Data gathered will be reviewed by the faculty committee annually.

2. Data gathered on academic warning, qualifying exam results, and degrees conferred will be tabulated by the Graduate Studies Office and reviewed annually by the DGS.
2. Data gathered in Graduating Student Survey will be reported annually to the faculty committee and DGS by the College Director of Assessment.

University of Rochester Master's Degree Program Assessment Plan

A. **Program title: Mechanical Engineering**

B. **Program degree: MS**

C. **Program objectives and program learning outcomes:**

Program objective 1. Program will prepare students to contribute to and practice in their field
Core knowledge, methods: Students will demonstrate broad level of knowledge of the theories and methods in the field
Specialization knowledge, methods: Students will demonstrate in depth knowledge of the theories and methods within specialized area(s) of their research
Research/ Methods: Students will conduct skillful research including gathering, processing and analyzing data, and drawing conclusions. Students will make considered choices in design of a research study. PLAN A only.

Program objective 2. Program will prepare students to be successful and responsible professionals in their field
Written communication: Students will convey ideas or arguments in clear, concise, well organized paper(s)
Oral communication: Students will convey ideas in cogent, persuasive, and organized presentations
Professional ethics: Students will appreciate the importance of and demonstrate a responsible, ethical manner in professional work
Teamwork: Students will demonstrate ability to work with others on projects, including sharing work involved in development of initial ideas and project plan, discussion of progress, and completion of work

D. **Program assessment methods - direct methods**

The following methods will be implemented annually and for each Master's degree candidate. Test results and faculty review forms for each method will be gathered in student file:
1- Plan A or B. Semester grades in core theory and method courses will be gathered into a report every year. Both complete 30 credit hours. Plan A students complete 16 credit hours in ME department and 6-12 thesis units. Plan B students complete 18 credit hours in ME department. Students must maintain B average or better.

2- Plan A. Master's thesis, written form, will be reviewed by faculty committee using the Master's Thesis Review Form. Data from review forms will be tabulated and reviewed by faculty annually.
3- Plan A. Master's thesis, oral defense, will be reviewed by faculty using the Master's Thesis Defense Review Form. Data from review forms will be tabulated and reviewed by faculty annually.
4- Plan B oral exam after completion of coursework.
5- Awards, fellowships and other distinctions given by the program, University of Rochester, or external organizations
6- Data gathered on leadership positions held by enrolled students and alumni -- reported by students and alumni in Graduating Student Survey and Alumni Survey, respectively

E. Program assessment methods - indirect methods

The following indirect methods will be implemented as noted:
1. Graduating Student Survey will be a web based survey distributed annually by the UR College Director of Assessment. The survey will ask students to rate program quality. The survey will also include questions that ask students to rate program quality and factors related to learning for communication, leadership, research and teaching.
2. Post-graduation career data - reported by students in above survey

F. Program assessment data review

3. Data gathered will be reviewed by the faculty committee annually.
4. Data gathered on academic warning, qualifying exam results, and degrees conferred will be tabulated by the Graduate Studies Office and reviewed annually by the DGS.
2. Data gathered in Graduating Student Survey will be reported annually to the faculty committee and DGS by the College Director of Assessment.