The College of Engineering, Department of Materials Science and Engineering is proposing curricular changes to their MS and PhD programs in Welding Engineering.

The proposal was received by the Graduate School on 8 February 2019. It was reviewed by GS/CAA on 4 March 2019, and revisions were requested on 6 March 2019. Revisions were received 28 March 2019 and reviewed by GS/CAA on 1 April 2019. No further revisions were requested, and the proposal was recommended for approval by Graduate Council. The proposal was approved by e vote of the Graduate Council on 10 May 2019.
Subject: RE: Status of WELDENG curricula changes  
Date: Tuesday, March 26, 2019 at 5:36:00 PM Eastern Daylight Time  
From: Cooper, Mark  
To: Graduate School Associate Dean  
CC: Schlueter, Jennifer, Quinzon-Bonello, Rosario, Windl, Wolfgang, Zhang, Wei  
Attachments: WE Publication Form (v4).docx, WELDENG Grad Curriculum Changes_FINAL 10-30-18 (v3).docx, image001.png

Dean Speer,

Thank you for your patience as we addressed a couple of items in the Welding Engineering curriculum proposal. Attached, please find the updated draft for your committee’s review. In this we have addressed the following:

1) The issue of authorship for the publication requirement (see pg 3 for the MS with Thesis requirement and pg 9 for the PhD requirement). The student is to be the first author in at least one conference paper or peer reviewed article or, in the case of an MS with Thesis student, s/he may be the presenter at a technical conference.
   a. **MS with Thesis requirement**: Presenter at a technical conference or first author in at least one conference proceedings paper or peer-reviewed article.
   b. **Ph.D. requirement**: Minimum of two publications accepted in peer-reviewed recognized scientific journals. The student must be the first author of at least one of these publications. Fulfillment of these requirements will be tracked by means of the attached “WE Publication Form”.

2) Correction of UCAT-UITL references have been made, see pg 11.

3) As we reviewed the PhD Candidacy and Dissertation Committee descriptions (see pg 9) we felt that we had not addressed what to do in the case of co-advised students. To this end, footnote #4 (pg 10) was clarified to add the co-advisor to a given committee along with the called-for committee members. For example:
   a. The Candidacy Committee would be made up of the advisor & co-advisor plus at least one WE faculty member, one member from the MSE department (i.e., from WE or MSE), and one member who is at minimum a Graduate Faculty member at OSU (five members total).
   b. The Dissertation Committee would be made up of the advisor & co-advisor plus at least one WE faculty member and one additional OSU Graduate Faculty member, in or out of WE (four members total to which the Graduate School would add a GS Rep.).

We hope this addresses the committee’s concerns. Please let us know if we may clarify anything further.

Sincerely,

Mark

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**THE OHIO STATE UNIVERSITY**

**Mark Cooper**
Graduate Studies Coordinator
College of Engineering
Dear Mark,

At our meeting on Monday, March 4, the combined GS/CAA curriculum subcommittee, which I co-chair with Faculty Fellow Jen Schlueter, reviewed your proposal. The subcommittee was enthusiastic about the proposal, and had only one request and one suggestion for clarification. With your revised proposal, please include a cover letter that points the subcommittee to the locations in the document where revisions have been made to address the requests.

1. The subcommittee recommended that you consider adding specifics about authorship in the guidelines in all cases where student presentation(s) and/or publication(s) are required program components.
2. The subcommittee notes that references to UCAT (e.g. p. 11) should be changed to UITL, as those units have recently merged under the UITL name.

Upon receipt of the revised proposal, the subcommittee will revisit and, if satisfied, move this forward to the Graduate Council for their review and approval. Jen and I will keep you posted as this moves along.

I also need to let you know that my Administrative Associate, Jill Toft, has taken a new position in the Office of International Affairs. We will miss her! There is a search open for a new person to fill the role. Meanwhile, questions that would have gone to Jill can be addressed to either Jen or me.

Best,
Shari

From: Graduate School Associate Dean <GS-AssociateDean@osu.edu>
Sent: Wednesday, March 6, 2019 5:39 PM
To: Cooper, Mark <cooper.73@osu.edu>
Cc: Schlueter, Jennifer <schlueter.10@osu.edu>; Quinzon-Bonello, Rosario <quinzon-bonello.1@osu.edu>; Windl, Wolfgang <windl.1@osu.edu>; Zhang, Wei <zhang.3978@osu.edu>
Subject: Status of WELDENG curricula changes

From: "Cooper, Mark" <cooper.73@osu.edu>
Date: Monday, February 11, 2019 at 1:55 PM
To: Toft, Jill <toft.20@osu.edu>
Cc: "Schlueter, Jennifer" <schlueter.10@osu.edu>, "Shari Speer (OSU)" <speer.21@osu.edu>, "Quinzon-Bonello, Rosario" <quinzon-bonello.1@osu.edu>, "Windl, Wolfgang" <windl.1@osu.edu>, "Zhang, Wei" <zhang.3978@osu.edu>
Subject: RE: Jill--Status of MATSCEN & WELDENG curricula changes?
Jill, this is wonderful, thank you for taking the time to detail this! This is a huge help, there was this sense of launching our curricula changes into the void of bureaucracy and hoping for the best. This gives me an idea of where we’re at.

Mark

From: Toft, Jill A. <toft.20@osu.edu>
Sent: Monday, February 11, 2019 1:27 PM
To: Cooper, Mark <cooper.73@osu.edu>
Cc: Schlueter, Jennifer <schlueter.10@osu.edu>; Speer, Shari <speer.21@osu.edu>
Subject: RE: Jill--Status of MATSCEN & WELDENG curricula changes?

Mark: There is a general outline of procedures on the Graduate School website https://gradsch.osu.edu/proposing-new-programs-degrees-and-specializations however, because Ohio Department of Higher Ed (ODHE) has been trying a new pilot program for approvals for the past year, we have not yet updated our processes on the website to reflect their new guidelines. ODHE is in the process of getting approval for those new guidelines from the Chancellor, and once that happens, we will be updating our website.

Generally, the procedure is thus: After receiving departmental approval and college approval, a program submits a request for a new degree, new program, or changes to an existing degree or program to the Graduate School. (Those should be submitted via the curriculum.osu.edu system if a new degree, or via email to Associate Dean Shari Speer (.21) and copied to me, in the event of changes to an existing program, or dual degrees, etc.)

The first step is review by our GS/CAA Curriculum Subcommittee, which generally meets every 2 weeks during the semester, and once or twice during the summer. The committee reviews the proposal, and either passes it forward, or asks the program for revisions. (Those revision requests from the committee are made via email to whomever submitted the proposal.) Once the committee has given its approval, a proposal moves forward for review/approval by Graduate Council (meets once per month) and then CAA (meets twice per month).

If the proposal is for a new degree, or changes of greater than 50% to an existing degree, then it also has to go to ODHE for a peer review process (4 week comment period from other Ohio institutions) followed by presentation at a meeting of the Chancellor’s Council on Graduate Studies.

That is a very broad overview. If you have any specific questions, I would be happy to answer them. Jennifer Schlueter (.10) is our faculty fellow for curriculum in the Graduate School, and Shari Speer is the Associate Dean for Academic Affairs. Either of them can answer curricular questions, as well.

Our next scheduled meeting of the GS/CAA Subcommittee (the one where the Welding Engineering proposal will appear, and also the MSENG if it makes it to it in time) is Monday, February 18.

Jill

From: Cooper, Mark <cooper.73@osu.edu>
Sent: Monday, February 11, 2019 10:27 AM
To: Toft, Jill A. <toft.20@osu.edu>
Cc: Speer, Shari <speer.21@osu.edu>; Schlueter, Jennifer <schlueter.10@osu.edu>; Quinzon-Bonello, Rosario <quinzon-bonello.1@osu.edu>; Windl, Wolfgang <windl.1@osu.edu>; Zhang, Wei <zhang.3978@osu.edu>
Subject: RE: Jill--Status of MATSCEN & WELDENG curricula changes?

Hi Jill,

Thanks for the update. The MATSCEN (MSE) curriculum change probably came from Rosie Quinzon-Bonello (cc’d) fairly recently, maybe late January? Author was Dr. Wolfgang Windl.

You say it’s in queue for an upcoming curriculum committee, when will that be held? I’m just trying to understand the whole process, it seems vague to me so I’d like to know what steps are involved and who is in charge of each step.

Thanks,

Mark
From: Toft, Jill A. <toft.20@osu.edu>
Sent: Monday, February 11, 2019 8:08 AM
To: Cooper, Mark <cooper.73@osu.edu>
Cc: Speer, Shari <speer.21@osu.edu>; Schlueter, Jennifer <schlueter.10@osu.edu>
Subject: RE: Jill--Status of MATSCEN & WELDENG curricula changes?
Mark: The Welding Engineering proposal only came in on Friday, Feb. 8, and has been placed into our queue for review at an upcoming meeting of our curriculum committee. Can you tell me the name of the Materials Science proposal, or give me some more specifics that would help me locate it?
Jill

From: Cooper, Mark <cooper.73@osu.edu>
Sent: Sunday, February 10, 2019 7:37 AM
To: Toft, Jill A. <toft.20@osu.edu>
Cc: Windl, Wolfgang <windl.1@osu.edu>; Zhang, Wei <zhang.3978@osu.edu>
Subject: Jill--Status of MATSCEN & WELDENG curricula changes?

Hi Jill,

MSE & WE have both submitted curriculum changes we hope to have in place for use in AU19. Could give us an update on where things stand and explain the series of next steps? Also, is this process described anywhere?

Thanks,

Mark

Mark Cooper
Graduate Studies Coordinator -
Academic Administrator
Department of Materials Science and Engineering
Welding Engineering
The Ohio State University
5027 Smith Lab
174 W. 18th Ave.
Columbus, OH 43210
614-292-7280
Mailing address:
177 Watts Hall
2041 College Rd.
Columbus, OH 43210
Proposed Curricular Changes to Welding Engineering
MS and Ph.D. Degree Requirements

Final 6/12/18, clarification of non-Core, in WE credit wording 9/27/18, w/ CCAA corrections 10/30/18
Graduate School,
The Graduate Studies Committee in Welding Engineering (WE) has been reviewing its graduate degree requirements and is seeking to make the changes outlined below.

The general impetus behind these changes:
1. Provide students with flexibility in course selection while also assuring that students achieve competence in core WE topics.
2. Encourage students to integrate WE concepts across the discipline
   a. Remove multi-hour testing in the MS Non-Thesis and Candidacy Examinations in favor of a written document that better permits evaluation of the student’s command of the subject.
   b. Place students in situations that require concise communication of WE concepts (see 3 a & b below).
3. Bolster graduate students’ effectiveness in communication. Two aspects are proposed:
   a. Aid graduate students’ development of effective interpersonal communication skills. The ability to communicate highly technical information to a less knowledgeable audience is a critical skill for our graduates. Placing WE graduate students in a position to assist with the instruction of the undergraduate students provides an ideal environment to develop such communication skills. Graduate students serve as Instructional Assistants mentored by the faculty instructor of the course with which s/he is assisting. The course instructor will provide guidance and instruction on how to convey new concepts to an undergraduate class and how to evaluate the effectiveness of that instruction.
   b. Publication/presentation requirement—Dissemination of knowledge in a peer-reviewed format is an important skill that we would like to further improve in the Welding Engineering curriculum. Welding Engineering graduate students are to contribute to this body of knowledge by publishing their research in high quality peer-reviewed journals, by giving presentations of research (written or oral), and learning from reviews and evaluations of peers in the field.

Since Welding Engineering joined the Department of Materials Science and Engineering in 2010, the WE GSC has been considering the benefits of the MSE graduate degree structure. Some of the changes below mirror the structure found in the Materials Science and Engineering graduate program degree requirements. The WE GSC felt it is time to implement these changes in an effort to streamline the degree requirements within the larger department. Additionally, the GSC seeks to provide our students with a more flexible degree that at the same time requires the students to have a greater command of cross-discipline concepts.

Timing—in place for SU19
The WE GSC would like to put these changes into effect for those students joining the graduate program in Summer 2019. Students currently in the program would be given the option to continue under the existing degree requirements or to adopt the new degree structures proposed below.

Please feel free to contact me if I may clarify any of these items. I look forward to your response.

Sincerely,

Antonio José Ramirez
Professor - Graduate Studies Chair
Welding Engineering
614-292-8662 | ramirezlondono.1@osu.edu
Changes to Structure of Degree Requirements, MS & PhD

1. **Welding Engineering MS with Thesis**

The current curriculum for the Master’s with Thesis and Master’s Non-Thesis requires students to take courses in each of five Welding Engineering concentration areas. The proposed structure seeks to permit greater flexibility while assuring exposure to a breadth of knowledge in the discipline.

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum 30 graduate credits for MS</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Within the 30 credits, minimum graded graduate credits required</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>Within these graded graduate credits, minimum from WELDENG (courses taken from the Core list apply toward this requirement)</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Of the 15 graded graduate credits to come from WELDENG, minimum number to come from 7000 level or greater</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>The student is to take at least four (4) courses from the WELDENG Core Courses. Two (2) courses must come from two (2) different categories found within the Primary list of core classes.</td>
<td>(N/A)</td>
<td></td>
</tr>
<tr>
<td>8 credits in one of five WE concentration areas</td>
<td>8</td>
<td>No longer required</td>
</tr>
<tr>
<td>1 course from each remaining WE areas</td>
<td>4 courses</td>
<td>No longer required</td>
</tr>
<tr>
<td>Instructional Assistant</td>
<td>(N/A)</td>
<td>1 term of assistance for regular students¹ (2 cr of Independent Study)</td>
</tr>
<tr>
<td>Minimum 10 credits of WE 6999</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Registration in WE 7895 AU &amp; SP terms</td>
<td>Required for regular students¹</td>
<td>Required for regular students¹</td>
</tr>
<tr>
<td>Presentation/Publication</td>
<td>(N/A)</td>
<td>1 required</td>
</tr>
</tbody>
</table>

¹ Minimum 9 cr, contributed from courses taught outside of the Welding Engineering Department.
Structure of proposed MS with Thesis requirements

I 30 total graduate credit hours are required
   A Of these 30 hours, at least 18 must be graded graduate level courses.
   B Of these 18 credit hours, at least 15 must be taken in WE.
      1. Of these 15 credit hours in WE, at least 6 credit hours must be taken at the 7000 level or greater in WE.
      2. Of these 15 credit hours in WE, the student is to take at least four (4) courses from the WELDENG Core Courses below.
         Two (2) courses must come from two (2) different categories found within the Primary list of core classes.
         **Primary Core Categories:**
            - Processes: 7001 or 7002
            - Design: 7201
            - Materials: 7101
         **Secondary Core Categories:**
            - Modeling: 7115
            - NDE: 7301
            - Polymers: 7406
   C Additional credit hours may come from other courses, besides those listed above, to bring the total graduate credit hours to 30 or greater. These credit hours will include:
      - **WE 7895 (Graduate Seminar and Colloquium)**
        - Full-time students are to enroll in WE 7895 every Autumn and Spring term.
        - Part-time students are expected to enroll in WE 7895 at least once per year.
        - Students are not required to enroll during the semester of graduation.
      - **WE 6999 (Research in Welding Engineering).** The student is to register for research credits under his/her advisor. Minimum of 10 credits.
      - Instructional Assistant service. The student will serve as an Instructional Assistant aiding the faculty with the instruction of undergraduate students.
        - The student will register for two (2) credit hours of WELDENG 7193.01 Independent Study during the term of IA service.
        - One (1) term of assistance is required of Thesis Master’s students.
        - Students will attend a university training workshop in support of this curricular requirement.
        - Students will serve as IAs, on average, six (6) hours per week during the term of service.

II Presentation and/or publication

Dissemination of research results is important for all students that write a thesis or dissertation.
To earn the MS with Thesis degree students will be required to give at least one (1) presentation at a technical conference (e.g., TMS, AWS, MS&T or equivalent) or publish at least one (1) conference proceeding paper or one (1) peer-reviewed article in a recognized scientific journal (e.g., Acta Materialia, Welding Journal or equivalent). The student should be the first author on at least one of these form(s) of publication.

III Presentation and defense of an acceptable thesis

   • Within the first term of registration the student is to submit a thesis topic summary to the student’s advisor. The summary is to include a proposed title, problem definition, objective, and a method of approach.
• The MS examination committee consists of the student's WE advisor and at least one other Graduate Faculty member (may be from WE or outside of WE).
• The student is permitted two attempts at examination.

2. **Welding Engineering MS Non-Thesis**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum 30 graduate credits for MS</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Within the 30 credits, minimum graded graduate credits required</td>
<td>26</td>
<td>24</td>
</tr>
<tr>
<td>Within these graded graduate credits, minimum from WELDENG (courses taken from the Core list apply toward this requirement)</td>
<td>14</td>
<td>20</td>
</tr>
</tbody>
</table>
| The student is to take at least four (4) courses from the WELDENG Core Courses. Two (2) courses must come from two (2) different categories found within the Primary list of core classes. | (N/A) | Primary Core Categories:  
Processes: 7001 or 7002  
Design: 7201  
Materials: 7101  
Secondary Core Categories:  
Modeling: 7115  
NDE: 7301  
Polymers: 7406 |
| Of the graded graduate credits in WELDENG, minimum number to come from 7000 level or greater | 8 | 8 |
| 8 credits in one of five WE concentration areas | 8 | No longer required |
| 1 course from each remaining WE areas | 4 courses | No longer required |
| Instructional Assistant | (N/A) | Required only for regular students; 1 term of assistance (2 cr) |
| Minimum 4 credits of WE 7193.01 Grade of Satisfactory (or passing letter grade for 7193.02) required for graduation. | 4 | Up to 4 credits of WE 7193.01 for regular students; Up to 6 credits of WE 7193.01 for Distance Learning students.  
The student and advisor will determine a Welding Engineering topic relevant to the student’s area of interest that will be used for the subject of the student’s individual studies report(s) and MS Final Examination. |
| Registration in WE 7895 AU & SP terms | Required for regular students | Required for regular students |
| Presentation/Publication | (N/A) | (N/A) |
| Final examination | Student answers 6 of 9 questions coming from courses in his/her WE Concentration area. Student answers 4 of 12 questions from the student’s WE Breadth areas. | The student’s WE 7193.01 final report will serve as the written portion of the exam. In addition, the student must present an oral seminar on the topic of the written document and the MS examination committee will evaluate both. (presentation and discussion with the Committee |
Structure of proposed MS Non-Thesis requirements

I 30 total graduate credit hours are required
A Of these 30 hours, at least 24 must be graded graduate level courses.
B Of these 24 credit hours, at least 20 credit hours must be taken in WE.
   1. Of these 20 credit hours in WE, at least 8 credit hours must be taken at the 7000 level or greater in WE.
   2. Of these 20 credit hours in WE, the student is to take at least four (4) courses from the WELDENG Core Courses below.
      Two (2) courses must come from two (2) different categories found within the Primary list of core classes.

   Primary Core Categories:
   Processes: 7001 or 7002
   Design: 7201
   Materials: 7101

   Secondary Core Categories:
   Modeling: 7115
   NDE: 7301
   Polymers: 7406

C Additional credit hours may come from other courses, besides those listed above, to bring the total graduate credit hours to 30 or greater. These credit hours will include:

- **WE 7895 (Graduate Seminar and Colloquium)**
  - On-campus full-time students are to enroll in WE 7895 every Autumn and Spring term.
  - On-campus part-time students are expected to enroll in WE 7895 at least once per year.
  - Distance Learning students are not required to enroll in WE 7895.
  - Students are not required to enroll during the semester of graduation.

- **Instructional Assistant service.** The student will serve as an Instructional Assistant aiding the faculty with the instruction of undergraduate students. [For full-time, on-campus students only; part-time and Distance Learning students are exempted from this requirement.]
  - One (1) term of assistance is required of Non-Thesis Master’s students.
  - The student will register for two (2) credit hours of WELDENG 7193.01 Independent Study during the term of IA service.
  - Students will attend a university training workshop in support of this curricular requirement.

- **Individual Studies in Welding Engineering Report to WE Advisor.** The student is to register for up to four (4) credits of WE 7193.01 with his/her advisor (up to six (6) such credits for Distance Learning students). In the final term in which 7193.01 credits are to be completed, the student is to present a final written report to his/her advisor on a topic in welding engineering agreed with the student and approved by the advisor. Additional considerations:
  - The MS Non-Thesis individual studies on Welding Engineering requirement can be taken in one term or over two terms. Most students take WE 7193.01, which is graded S/U, though if a student cannot be reimbursed for educational expenses with an S/U grade, s/he may petition to take WE 7193.02, which is letter graded.
• A grade of Satisfactory (7193.01) or a passing letter grade (7193.02) is required to earn an MS.
• The student is to consult with the faculty advisor to determine the topic of the report.
• The student’s WE 7193.01 final report will serve as the written portion of the MS Non-Thesis final examination. In addition, the student must present an oral seminar on the topic of the written document and the MS examination committee will evaluate both.
• The oral presentation, questions and discussion may occur in person before the committee or via video conferencing, in line with Graduate School guidelines.
• If the student is co-advised, s/he is to divide WE 7193.01 credits of enrollment between the co-advisors.

D Final Examination

The student and advisor will determine a Welding Engineering topic relevant to the student’s area of interest that will serve as the subject of the student’s WE 7193.01 Individual Studies in Welding Engineering and the MS final examination.

The student will write a report on this topic, limited to 20 pages. Any images are to be included within this 20 page limit; bibliography citations may extend beyond the 20 page limit. This report will serve as the written portion of the MS Exam evaluated by the MS Committee.

The student will provide to the MS Committee an oral presentation of the report. The oral presentation, questions and discussion may occur in person before the Committee or via video conferencing, in line with Graduate School guidelines. The MS Committee may ask questions to the student as part of this oral presentation.

MS Examination Committee membership

The MS Examination Committee consists of the student’s advisor and one other Graduate Faculty member assigned by the Welding Engineering Graduate Committee.

### 3. Welding Engineering Ph.D.

<table>
<thead>
<tr>
<th>Current</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum 80 graduate credits for Ph.D.</strong></td>
<td><strong>Minimum 80 graduate credits for Ph.D.</strong></td>
</tr>
<tr>
<td>Of these 80 credits, at least 30 graded</td>
<td>Of these 80 credits, at least 30 graded</td>
</tr>
<tr>
<td>graduate level courses.</td>
<td>graduate level courses.</td>
</tr>
<tr>
<td>Of these 30 credits at least 16 credits are</td>
<td>Of these 30 credits, the student is to take</td>
</tr>
<tr>
<td>to come from 7000-level course work in WE.</td>
<td>at least four (4) courses from the WELDENG</td>
</tr>
<tr>
<td>The 30 credits are to consist of:</td>
<td>Core Courses. Two (2) courses must come from</td>
</tr>
<tr>
<td>Major area of WE concentration. At least 9</td>
<td>two (2) different categories found within the</td>
</tr>
<tr>
<td>credits are to come from one of the five WE</td>
<td>Primary list of core classes.</td>
</tr>
<tr>
<td>areas of concentration.</td>
<td><strong>Primary Core Categories:</strong></td>
</tr>
<tr>
<td>Minor area of WE concentration. At least 6</td>
<td>- Processes: 7001 or 7002</td>
</tr>
<tr>
<td>credits are to come from one of the remaining</td>
<td>- Design: 7201</td>
</tr>
<tr>
<td>areas of concentration.</td>
<td>- Materials: 7101</td>
</tr>
<tr>
<td><em>External minor.</em> At least 6 credits are to</td>
<td>- Secondary Core Categories:</td>
</tr>
<tr>
<td>come from a coherent sequence of courses from</td>
<td>- Modeling: 7115</td>
</tr>
<tr>
<td>a degree program outside of WE that supports</td>
<td>- NDE: 7301</td>
</tr>
<tr>
<td>the student’s area of emphasis.</td>
<td>- Polymers: 7406</td>
</tr>
<tr>
<td>Up to 9 credits beyond those above may come</td>
<td><strong>Upon completion of the four Core Courses,</strong></td>
</tr>
<tr>
<td>from any graded graduate credit that is</td>
<td>and a 3.0 GPA or greater in the Core, the</td>
</tr>
<tr>
<td>5000-level or greater in or outside of WE.</td>
<td>student may apply for the Candidacy Exam.</td>
</tr>
<tr>
<td>At least 50 graduate credit hours may come</td>
<td>At least 9 credits, beyond those required in</td>
</tr>
<tr>
<td>from other courses, besides those listed</td>
<td>the Core, are to come from 7000-level or</td>
</tr>
<tr>
<td>above, to bring the total graduate credit</td>
<td>greater, graded graduate WELDENG courses.</td>
</tr>
<tr>
<td>hours to at least 80. Can include WE 7895,</td>
<td>Up to 9 credit hours beyond those above may</td>
</tr>
<tr>
<td>6/8999</td>
<td>come from any hard science graded graduate</td>
</tr>
<tr>
<td><strong>All full-time students are to register for</strong></td>
<td>credit that is 5000-level or greater in or</td>
</tr>
<tr>
<td>WE 7895 every AU &amp; SP term; registration not</td>
<td>outside of WELDENG.</td>
</tr>
<tr>
<td>required in final term of enrollment.</td>
<td><strong>(unchanged)</strong></td>
</tr>
<tr>
<td>**At least 20 credits of WE 6/8999 is</td>
<td><strong>(unchanged)</strong></td>
</tr>
<tr>
<td>required.**</td>
<td><strong>(unchanged)</strong></td>
</tr>
<tr>
<td>Qualifying Examination (determines likelihood</td>
<td>Instructional Assistant</td>
</tr>
<tr>
<td>of success in PhD)</td>
<td>2 terms of assistance as an Instructional</td>
</tr>
<tr>
<td>Cand. Exam</td>
<td>Assistant (2 x 2 cr of WE Independent Study)</td>
</tr>
<tr>
<td>Candidacy Exam (determines likelihood of</td>
<td>(No longer required)</td>
</tr>
<tr>
<td>success in PhD)</td>
<td><strong>Dissertation Overview</strong></td>
</tr>
<tr>
<td>(N/A)</td>
<td>Internal exercise, feedback on dissertation</td>
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<tr>
<td>(N/A)</td>
<td>status At least 6 months before Final</td>
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<td>(N/A)</td>
<td>Examination.</td>
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<td>(N/A)</td>
<td>Minimum of 2 publications in a peer-reviewed</td>
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<td>(N/A)</td>
<td>journals.</td>
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Structure of proposed Ph.D. requirements

I 80 total graduate credit hours are required

Plan of study—Within the first term of enrollment the student is to submit to his/her advisor a plan of study mapping out the proposed course work to meet the requirements above. This plan of study is to be submitted to the WE Graduate Studies Committee Chair for review.

A Of these 80 credits, at least 30 credits must come from graded graduate level courses.

1. Of these 30 credits, the student is to take at least four (4) courses from the WELDENG Core Courses. Two (2) courses must come from two (2) different categories found within the Primary list of core classes.

   Primary Core Categories:
   Processes: 7001 or 7002
   Design: 7201
   Materials: 7101

   Secondary Core Categories:
   Modeling: 7115
   NDE: 7301
   Polymers: 7406

   Upon completion of the four Core Courses, and a 3.0 GPA or greater in the Core, the student may apply for the Candidacy Exam.

2. At least 9 credits, beyond those taken in the Core, are to come from 5000-level or greater, graded graduate WELDENG courses.

3. Up to 9 credit hours beyond those above may come from engineering and/or hard science graded graduate credit that is 5000-level or greater in or outside of WELDENG.

B Additional credit hours may come from other courses, besides those listed above, to bring the total graduate credit hours to 80 or greater. These credit hours will include:

   • WE 7895 (Graduate Seminar and Colloquium)
     ▪ Full-time students are to enroll in WE 7895 every Autumn and Spring term.
     ▪ Part-time students are expected to enroll in WE 7895 at least once per year.
     ▪ Students are not required to enroll during the semester of graduation.
   • WE 6999 and 8999 (Research in Welding Engineering). The student is to register for research credits under his/her advisor.
   • Instructional Assistant service. The student will serve as an Instructional Assistant aiding the faculty with the instruction of undergraduate students.
     ▪ The student will register for two credit hours of WELDENG 7193.01 Individual Study during the term of IA service.
     ▪ Two terms of assistance are required of Ph.D. students.
     ▪ Students will attend a university training workshop in support of this curricular requirement.

II Successful completion of the Candidacy Examination

   This examination is a comprehensive test of the student’s knowledge of welding engineering and allied fields. To qualify to take the Candidacy Examination the student must complete the Core Course requirements above earning a cumulative GPA in the Core Courses of 3.0 or greater. The Research Summary and Critical Literature Review must be solely the work of the student.
The Candidacy Exam Committee is comprised of four (4) OSU Graduate Faculty, as follows:

1. The student’s WE advisor
2. At least one member of the WE faculty
3. At least one member who is a faculty member in the Department of Materials Science and Engineering (i.e., can be MSE or WE faculty)
4. One committee member may be a Graduate Faculty member at OSU, as defined by the Graduate School Handbook, from any program

The written portion of the exam will consist of a twenty-page Critical Literature Review. This will be submitted to the Candidacy Exam Committee no less than two weeks before the oral exam date.

The oral portion of the exam will be two hours in length before a committee of four OSU graduate faculty, as detailed above.

The exam is offered in Autumn and Spring semesters only.

III Dissertation Overview

Public presentation of the student’s research progress to his/her Dissertation Committee. The student and advisor should form a Dissertation Committee at a point early in the student’s enrollment.

- The Dissertation Overview Committee is comprised of three (3) OSU Graduate Faculty:
  - The student’s WE advisor
  - At least one WE faculty member
  - One additional OSU Graduate Faculty member, in or out of WE
- The Overview is to take place at least six (6) months before dissertation defense.
- This is designed so that the Dissertation Committee will be able to give the student advice throughout the completion of the dissertation.
- The Dissertation Overview must be announced to the public at least one week before the Overview takes place.

IV Publication requirement

The student is to generate a minimum of two publications which are accepted in peer-reviewed, recognized scientific journals (e.g., Acta Materialia, Welding Journal or equivalent). If impact factor is 4 or greater, only 1 publication is required. The student should be the first author on at least one of these manuscripts.

V Presentation and defense of an acceptable dissertation

The dissertation is a scholarly contribution to knowledge in the student’s area of specialization. Through it, the student is to demonstrate a high level of knowledge and the capacity to function as an independent scholar.

The Final Oral Exam tests originality, independence of thought, the ability to synthesize and interpret, and the quality of research presented.

Dissertation Committee membership

The Dissertation Committee is comprised of three (3) OSU Graduate Faculty:

- The student’s WE advisor
- At least one WE faculty member
- One additional OSU Graduate Faculty member, in or out of WE
Notes:
1. Regular Students are students attending classes on campus, as either part-time or full-time students.
2. Only one of the 7001 or 7002 courses can be counted as a core course, not the two of them.
3. The student’s advisor should verify that the classes are hard science. Such classes can be taken in the CoE or other colleges. If the Advisor and student have doubts about this requirements for any class that they want to count towards graduation, an official petition should be made to the WELDENG GSC, through the Graduate Program Coordinator attaching the proposed course syllabus. At the time the student requests to graduate, the WELDENG GSC will verify if the classes have complied with this requisite.
4. If the student is co-advised, the co-advisor is allowed in addition to the aforementioned examination committee. For example, the candidacy exam committee would comprise advisor, co-advisor and three other faculty members.

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**Instructional Assistant Curricular Requirement (IA)**

The Welding Engineering graduate program curriculum currently lacks structured opportunities for students to convey technical information and concepts to less knowledgeable audiences. A curricular requirement was approved by the WE Graduate Studies Committee in which graduate students would be required to assist the WE faculty with the instruction of the undergraduate courses.

- An MS student will assist with 1 course during his/her time in the program; A Ph.D. student will assist with 2 courses during his/her time in the program.
- Such assistance is to involve, on average over the course of the term, no more than 6 hours per week of the student’s time.
- Students would receive 2 credits of **graduate S/U Individual Study** credit for each term of service.
- MS/Ph.D. students will be required to attend a three-day [UITL training workshop](https://uitl.osu.edu) in the first Summer following the student’s initial enrollment (ex., if first term of enrollment is AUYY, **UITL** workshop will be taken in SUYY+1).
- This will not be a requirement of the WE part-time and Distance Learning students. DL students are unable to attend the on-campus **UITL** training. Also, in our experience, students pursuing the part-time and/or DL MS are typically at a point in their careers where they have made many instructional presentations at their place of employment, so this requirement would be of minimal benefit.

**Publication/Presentation Requirement**

The Welding Engineering graduate curriculum currently lacks a structured publication/presentation requirement (outside of thesis/dissertation). Dissemination of research results is important for all students that write a thesis or dissertation, whether or not they are planning to pursue an academic career. Effective beginning with graduate students entering the WE graduate program in SU19, to earn the degree students will be required to present and/or publish as follows:

- **MS with Thesis** students are to give at least 1 presentation at a technical conference or publish at least 1 conference proceeding paper or 1 peer-reviewed article in a relevant journal. The student should be the first author on at least one of these publications.
- The publication/presentation requirement is not required of **MS Non-Thesis** students; the updated MS Non-Thesis Exam and WE 7193.01 requirements below are sufficient to show written and oral communication proficiency for the non-thesis degree.
- **Ph.D.** students are to publish at least 2 articles in relevant peer-reviewed journals. If impact factor is 4 or greater, only 1 publication is required. The student should be the first author on at least one of these manuscripts.
- **Enforcement**—the advisor will certify (by completing the Welding Engineering Publication Form and approving the student’s Application to Graduate) that the student has met this requirement (i.e., published or accepted for publication).
- A copy of the paper(s) or publication(s) should be provided to the Welding Engineering GSC and it should be part of the student dossier.

**MS Non-Thesis Oral Seminar**

Currently lacking in the MS Non-Thesis degree is the ability to evaluate the student’s verbal communication skills. Beginning in SP19, the student must present an oral seminar on the topic of the student's MS Examination written document.

Additional considerations:

- The student is to consult with the faculty advisor to determine the topic of the report.
The student’s WE 7193.01 final report will serve as the written portion of the MS Non-Thesis exam. The student must present an oral seminar on the topic of the written document and the MS examination committee will evaluate both.

The oral presentation may occur in person before the committee or via video conferencing, in line with Graduate School guidelines.

Following the oral presentation, the student will be questioned by his/her MS Examination committee.

Remote presentation—by such means as Skype, etc.—that follows the Graduate School guidelines is permitted.

**Change to MS Non-Thesis Examination**

At present, the MS Non-Thesis final examination consists of a four hour, multi-question exam comprised of questions drawn from courses previously taken by the student. In essence, the student is simply being tested twice on the same material. This format is limited in its ability to evaluate the student’s mastery of the subjects learned. Beginning in SP19, MS Non-Thesis examinations in WE will have the following structure:

- The student and advisor will determine a Welding Engineering topic relevant to the student’s area of interest that will be used for the subject of the student’s Individual Study report (WE 7193.01/.02, see above).
- The student will write a 20 page document on this topic. Images/graphs are to be included within this 20-page limit; references would not be included in this 20-page limit.
- The document will be reviewed for plagiarism.
- This document would serve as the written portion of the MS Non-Thesis examination.
- The student must present an oral seminar on the topic of the written document and the MS Examination committee will evaluate both.
- Following the oral presentation, the student will be questioned by his/her MS Examination committee.

**Change to the Candidacy Exam format**

At present, the Welding Engineering Candidacy Examination consists of an eight-hour, multi-question exam comprised of questions drawn from courses previously taken by the student. In essence, the student is simply being re-tested on the same material. This format is limited in its ability to evaluate the student’s readiness to continue to Ph.D.

To better gauge comprehensive command of the field, the Welding Engineering graduate program seeks to adopt the examination structure used by the Materials Science and Engineering graduate program. In MSE, a student qualifies for Candidacy by earning a minimum GPA in a set of PhD Core Courses. The written portion of the Candidacy Exam consists of a literature review which is evaluated by the committee during the oral portion of the exam. The oral examination also includes a review of the student’s research and academic progress including general and specialized questions relevant to MSE. Adopting such a format will be more effective in evaluating candidates for the Welding Engineering Ph.D.

**Deadlines & Restrictions**

The Candidacy Examination is to be taken within five academic terms of the student joining the Welding Engineering Graduate Program (an “academic term” is Autumn or Spring). The examination is offered twice a year, in the Autumn and Spring terms. The exam may only be taken after the student has completed the Welding Engineering PhD Core Course requirement.
II Prerequisites

The student is to take at least four (4) courses from the WELDENG Core Courses. Two (2) courses must come from two (2) different categories found within the Primary list of core classes

**Primary Core Categories:**
- Processes: 7001 or 7002
- Design: 7201
- Materials: 7101

**Secondary Core Categories:**
- Modeling: 7115
- NDE: 7301
- Polymers: 7406

**Earn a 3.00 or greater cumulative GPA in the WE PhD Core Courses**

To qualify to take the Candidacy Exam, students must earn a cumulative GPA of 3.00 or greater for the Core Courses taken prior to the Candidacy Exam.

Should the student not earn a 3.0 or greater in the Core Courses, the student may re-take the Core Course in which the low grade was earned, replacing the first grade with that earned during the second registration. Alternately, the student may take a different Core Course as long as s/he adheres to the Primary/Secondary requirements.

III Requesting to take the Candidacy Exam

The student should contact the MSE Graduate Studies Coordinator at least one week before the start of the term in which s/he wishes to take the exam.

**Research Summary document:**

A research project title, half-page research abstract, and five page research summary is to be submitted at the start of the term in which the student wishes to take the exam. This document, along with an OSU Advising Report, will be provided to the student’s Candidacy Committee to provide background on the student’s research and academic progress.

IV Candidacy Exam Committee

The Candidacy Examination Committee is composed of four OSU graduate faculty members and is chaired by the student’s advisor. Committee membership is reviewed by the WE GSC and corrections to membership are to be made, if necessary.

The Candidacy Exam Committee is comprised of:

- The student’s WE advisor (co-advisors are not permitted to be on the committee)
- At least one member of the WE faculty
- At least one member who is a faculty member in the Department of Materials Science and Engineering (i.e., can be MSE or WE faculty)
- One committee member may be a Graduate Faculty member at OSU, as defined by the Graduate School Handbook, from any program

V Application for Candidacy—on-line application form and timing

The student is to log in to GradForms.osu.edu (OSU username and password) and create an Application for Candidacy. The time, date, location, and committee membership is to be provided. Upon submission, the Application then moves to the advisor and Graduate Studies Committee Chair for approval.
The last date on which the oral exam may take place is the last business day prior to the start of the next term. Therefore, the last date on which the Application for Candidacy may be approved is two weeks before the last business day before the start of the next term.

VI Candidacy Examination

Note: A student may make no more than two attempts at passing the Candidacy Exam while a student at The Ohio State University.

The examination is composed of both a written and oral part, as follows:

A. Written portion: Critical Literature Review
   The written portion of the Candidacy Exam is comprised of a Critical Literature Review.
   
   Content and expectations
   The written portion of the Candidacy Exam shall be a comprehensive and critical review of the literature in the student's area of research. The most significant issues must be clearly highlighted and thoroughly described.
   
   The "critical" aspect of the review implies that the student should add some of his or her own commentary on the literature regarding aspects such as quality, importance, interconnectivity, etc. The document will normally conclude with a description of the "unresolved issues" that are considered to be worthy of further review. The document should be written at a level such that it may be understood by an examiner (WE faculty member) who is not an expert in the particular subject matter. Overall, it should demonstrate to the examining committee a thorough and comprehensive understanding of the field.
   
   Format and submission of the Critical Literature Review
   The document is to be a maximum of twenty pages in length, exclusive of references. Any images are to be included in the twenty page length, images are not to be included in an appendix.
   
   Evaluation of the written portion of the exam prior to oral examination
   The Candidacy Exam Committee should meet prior to the oral portion to evaluate the written document. The student should be notified if the written portion is deemed sufficiently poor that he or she would be unlikely to pass the examination, and given the option to waive the oral portion of the Candidacy Exam.

B. Oral portion of the Candidacy Examination
   The oral portion shall be based on a series of questions intended to examine the student's understanding of the scientific and engineering principles related to the field and one's capacity for clear thinking. The oral portion of the exam consists of questions asked by the Candidacy Exam Committee and the student's responses; the student is not to give an oral presentation to the Committee. Answers to individual questions shall be limited to about 10 minutes in length. As stated above, questions regarding the student’s academic understanding, knowledge of relevant literature, and ability to carry out research may be pursued during the oral examination.
   
   The last date on which the oral exam may take place is the last business day prior to the start of the next term. Therefore, the last date on which the Application for Candidacy may be approved is two weeks before the last business day before the start of the next term.
This form is used to detail how the student has met the publication/presentation requirement for the Welding Engineering M.S. with Thesis or Ph.D. degree. The signatures of the student and advisor(s) confirm completion of this requirement.

**Student Name:** ___________________________  **Date:** ___________________________

**OSU Email Address:** ____________________________________________________

**Advisor Name(s):** _____________________________________________________

### M.S. with Thesis--

*List one conference presentation, conference paper, or journal paper for which the student is the first author.*

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<th>Conference presentation</th>
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**Publication title:** _____________________________________________________

### Ph.D.

*List two journal papers or one if the journal impact factor is higher than 4. The student must be the first author for at least one of the papers.*

1. **Journal name and journal impact factor:** ________________________________

   **Publication title and name of first author:** _____________________________

   **Date of acceptance:** ___________________________

2. **Journal name and journal impact factor:** ________________________________

   **Publication title and name of first author:** _____________________________

   **Date of acceptance:** ___________________________

*Please attach proof of acceptance or publication to this form. Email notification of such acceptance or publication is acceptable.*

**Student signature:** ___________________________  **Advisor signature(s):** ___________________________