WELDENG 7012 (Approved): Resistance Welding Processes

Course Description
This course addresses the fundamentals, theory, and application of Resistance Welding processes, with emphasis on processes, equipment, materials, and quality control.

Prior Course Number: 602, 702
Transcript Abbreviation: Res Weld Proc
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Graduate
Student Ranks: Masters, Doctoral
Course Offerings: Autumn
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 2.0
Repeatable: No
Time Distribution: 2.0 hr Lec
Expected out-of-class hours per week: 4.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: Graduate Standing and 4002 or 7002 or permission of instructor.
Exclusions: Not open to students with credit in 602 or 702 or 4012.
Cross-Listings:
The course is required for this unit's degrees, majors, and/or minors: No
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: Yes
Subject/CIP Code: 14.9999
Subsidy Level: Doctoral Course

Programs

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>WELDENG</td>
<td>Welding Engineering</td>
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General Information

This is a graduate level course that will be taught at the same time as 4012. Lecture content will be the same as 4012, but graduate students will be required to conduct detailed review of research papers related to resistance welding provide brief class presentations.

Course Goals

| Development of the theories and fundamentals of Resistance Welding processes. |
| Understanding of Resistance Welding equipment details including power supplies and tooling. |
Understanding of methods for quality control and mechanical testing of Resistance Welds.

Understanding of the Resistance Welding of important structural materials including carbon and low alloy steels, stainless steels, aluminum, and titanium.

Understanding of the Resistance Welding of coated steels including galvanized, aluminized, tin coated, and terne coated steels.

Course Topics

<table>
<thead>
<tr>
<th>Topic</th>
<th>Lec</th>
<th>Rec</th>
<th>Lab</th>
<th>Cli</th>
<th>IS</th>
<th>Sem</th>
<th>FE</th>
<th>Wor</th>
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</thead>
<tbody>
<tr>
<td>Resistance Welding fundamentals.</td>
<td>10.0</td>
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<tr>
<td>Resistance Welding equipment, tooling and power supplies.</td>
<td>4.0</td>
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<tr>
<td>Resistance Welding of materials.</td>
<td>5.0</td>
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<tr>
<td>Resistance Welding of coated steels.</td>
<td>5.0</td>
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<tr>
<td>Resistance Welding quality, quality control, and testing.</td>
<td>4.0</td>
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Grades

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<tr>
<th>Aspect</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Exam #1</td>
<td>30%</td>
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<tr>
<td>Exam #2</td>
<td>30%</td>
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<tr>
<td>Final exam</td>
<td>40%</td>
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Representative Textbooks and Other Course Materials

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
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<tbody>
<tr>
<td>4502 Class Notes</td>
<td>Dickinson, Phillips</td>
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ABET-EAC Criterion 3 Outcomes

<table>
<thead>
<tr>
<th>Course Contribution</th>
<th>College Outcome</th>
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<tbody>
<tr>
<td>***</td>
<td>a  An ability to apply knowledge of mathematics, science, and engineering.</td>
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<td>*</td>
<td>b  An ability to design and conduct experiments, as well as to analyze and interpret data.</td>
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<td>**</td>
<td>c  An ability to design a system, component, or process to meet desired needs.</td>
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<td></td>
<td>d  An ability to function on multi-disciplinary teams.</td>
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<td>**</td>
<td>e  An ability to identify, formulate, and solve engineering problems.</td>
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<td>f  An understanding of professional and ethical responsibility.</td>
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<td>g  An ability to communicate effectively.</td>
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<td>h  The broad education necessary to understand the impact of engineering solutions in a global and societal context.</td>
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<td>i  A recognition of the need for, and an ability to engage in life-long learning.</td>
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<td>j  A knowledge of contemporary issues.</td>
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<td>***</td>
<td>k  An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.</td>
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WELDENG ABET-EAC Criterion 9 Program Criteria Outcomes
<table>
<thead>
<tr>
<th>Course Contribution</th>
<th>Program Outcome</th>
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<tbody>
<tr>
<td>***</td>
<td>1  an ability to select and design welding materials, processes and inspection techniques based on application, fabrication and service conditions</td>
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<td>m  an ability to develop welding procedures that specify materials, processes and inspection requirements</td>
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<td>n  an ability to design welded structures and components to meet application requirements</td>
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**Prepared by:** David Phillips