## Course Information

### Course name:
Manufacturing Processes 1/ Metal Forming

### Course code:
IE 0936311

### Credits hours
3

### Course instructor’s name, E-mail, and phone:

### Course Coordinator:

### Text book:

### Other reference(s):

### Course Description:
Mechanical behavior and forming of metals, different types of mechanical behavior and main factors affecting it. Yield criteria, representative stress and representative strain, work due to plastic deformation, classification of forming processes with respect to strain rate and temperature. Temperature rise in dynamic forming. Bulk deformation processes: forging, extrusion, rolling, rod and wire drawing. Sheet forming processes: blanking, deep-drawing and bending.

### Providing Department:
Industrial Engineering

### Prerequisite Course:
IE 0906273

### Course type
Mandatory

### Assessment Methods:

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<th>Weight %</th>
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### Course Learning Outcomes:

#### CLO1
Understand the various bulk-metal deformation processes

#### CLO2
The ability to choose the proper bulk-metal deformation process for the particular application

#### CLO3
Understand the various sheet-metal deformation processes

#### CLO4
The ability to choose the proper sheet-metal deformation process for the particular application

### Brief list of topics

<table>
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<tr>
<th>Week #</th>
<th>Topic</th>
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<tr>
<td>3</td>
<td>Mechanical Properties of Metals: Introduction to mechanical</td>
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properties, stress-strain relationships; tensile properties; compression properties.

4-9 Bulk-metal Deformation Processes: Introduction; rolling types and analysis; other deformation processes related to rolling, forging types ad analysis; forging hammers and presses;

10-14 Sheet-metal Deformation Processes: Introduction; Cutting operations (shearing, blanking and punching); Cutting operations and its engineering analysis; other sheet-metal cutting operations; bending operations and its types; engineering analysis of bending; other bending and forming operations; drawing and its mechanics and analysis; other drawing operations; defects in drawing; other sheet-metal forming operations; dies and presses for sheet-metal processes; sheet-metal operations not performed on presses; and bending of tube stock.

15 Projects Discussion
16 Revision
17 Final Exam

Important Notes:
- Do not hesitate to ask questions
- You are required to bring a notebook and take notes in classes.
- Students are expected to attend every class session and they are responsible for all material, announcements, schedule changes, etc., discussed in class.
- Discuss the assignments among yourselves
- Don’t Cheat; direct copying of others work will NOT be allowed or tolerated and will result in a reduction of grade. If you are found to be cheating in any way, on an exam or assignment, even signing the roll sheet for another student, you will be given an “F” for the course. There will be no exceptions.
- All cases of academic dishonesty will be handled in accordance with university policies and regulations. JU policy requires the faculty member to assign ZERO grade (F) if a student misses 15% of the classes that are not excused, and 20% of the classes that are excused
- Students are expected to be ready to take a quiz any time they have a class. There will be no make-up quizzes or home works.

**The B.Sc. in industrial Engineering program enables students to achieve, by the time of graduation the following program learning outcome (SOs)**

<table>
<thead>
<tr>
<th></th>
<th>An ability to apply knowledge of mathematics, science and engineering.</th>
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<th>An ability to communicate effectively.</th>
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<tr>
<td>a</td>
<td>An ability to design and conduct experiments, as well as to analyze and interpret data.</td>
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<td>An ability to understand the impact of engineering solutions in a global, economic, environmental and societal context.</td>
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<td>b</td>
<td>An ability to design a system, component, or process to meet desired needs within realistic constraints.</td>
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<td>An ability to engage in life-long learning.</td>
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<td>c</td>
<td>An ability to function productively as part of multidisciplinary teams and show leadership qualities.</td>
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<td>An ability to acknowledge contemporary issues related to the discipline.</td>
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<td>d</td>
<td>An ability to identify, formulate and solve engineering problems.</td>
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<td>An ability to use techniques, skills and modern engineering tools necessary for engineering practice.</td>
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<td>e</td>
<td>An ability to understand professional and ethical responsibilities.</td>
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