**Name of module:** Laser Material Processing

**Keywords:** Cutting, forming, laser, manufacturing, metal sheet, punching, welding

**Module number:** MB 601, 602 (partial)

**Target groups:** 6 Semester, exchange students

**ECTS-Credits:** 3

**Language of instruction:** English

**Module owner:** Prof. Dr.-Ing. Armin Horn

**Date of last change:** 25.08.2013

### Extent of work (hours)

<table>
<thead>
<tr>
<th>Workload</th>
<th>Contact hours</th>
<th>Self study</th>
<th>Exam preparation</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>45</td>
<td>30</td>
<td>15</td>
</tr>
</tbody>
</table>

### Prerequisites:
Engineering materials, manufacturing technology

### Total target:
To understand the laser material processing

### Module content:
**Summary of lecture:**
- Laser beam sources
  - principle of laser and beam characteristics
  - beam guidance and -forming
  - laser security
- Laser material processes
  - cutting/welding/removing/hardening/marking
  - quality systems for laser material processing
- Laser- and sheet metal processing systems
  - cutting and welding systems
  - punching and forming of sheet metal
  - design of sheet and pipe constructions

**Summary of lab:**
- Design of sheet metal parts in 3D-CAD-systems
- Programming of machines for sheet metal processing
- Manufacturing of sheet metal parts
- Marking
- Demonstration of complete sheet metal process chain

**Reference material:** Lecture notes

**Offered:** Every semester

**Relevance for other study programs:** Automotive Engineering

### Submodules and assessments

**Title of submodule:** Laser Material Processing

**Type of instruction / form of learning:** Lectures, practices and exam preparation

**Hours per week:** 2

**Aims, learning outcomes:** See above

**Estimated student workload:** 60 h
<table>
<thead>
<tr>
<th><strong>Title of submodule:</strong></th>
<th>Laboratory Laser Material</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of instruction / form of learning:</strong></td>
<td>Practices in laboratory</td>
</tr>
<tr>
<td><strong>Hours per week:</strong></td>
<td>1</td>
</tr>
<tr>
<td><strong>Aims, learning outcomes:</strong></td>
<td>Deepening and using the knowledge obtained in the lectures</td>
</tr>
<tr>
<td><strong>Estimated student workload:</strong></td>
<td>30 h</td>
</tr>
</tbody>
</table>
| **Type of assessment:** | Lecture: Written exam  
Laboratory: Certificate |