# Data-Based Dynamic Modeling

**AR-206**

<table>
<thead>
<tr>
<th>Rota</th>
<th>Duration</th>
<th>Semester</th>
<th>SWS</th>
<th>Credit Points</th>
<th>Workload</th>
</tr>
</thead>
<tbody>
<tr>
<td>annually SS</td>
<td>1 Term</td>
<td>2nd (Semester)</td>
<td>2 SWS</td>
<td>3</td>
<td>90 h</td>
</tr>
</tbody>
</table>

## 1 Modul Structure

<table>
<thead>
<tr>
<th>Course (Abbreviation)</th>
<th>Type/ SWS</th>
<th>Presence</th>
<th>Self Study</th>
<th>Credit Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Data-Based Dynamic Modeling (DDM)</td>
<td>Lecture/ 1 SWS</td>
<td>15 h</td>
<td>45 h</td>
<td>2</td>
</tr>
<tr>
<td>b) Data-Based Dynamic Modeling (DDM)</td>
<td>Tutorial/ 1 SWS</td>
<td>15 h</td>
<td>15 h</td>
<td>1</td>
</tr>
</tbody>
</table>

## 2 Language

English

## 3 Content

1. Identification of simple models from step responses.
3. Modeling using nonlinear black box models (perceptron neural nets, radial-basis-function nets), training, dynamic models, quality of neural net models.

The course takes place in the second half of the semester.

**Literature:**
- Slides
- Handouts

## 4 Competencies

The students can identify the dominant dynamics of a process from step responses and can apply modern methods and algorithms to identify the parameters of linear process models from measured data. They know the structure of nonlinear black box models and can judge the quality and the limitations of data-based models.

## 5 Examination Requirements

The final exam will be an oral (30 minutes) or written (2 hours) exam, depending on the number of participants (form will be announced in the second week of course). In addition, there will be a graded homework.

## 6 Formality of Examination

- [ ] Module Finals
- [ ] Accumulated Grade

## 7 Module Requirements (Prerequisites)

Basic knowledge of dynamic systems as e.g. provided by the course Control Theory and Applications.

## 8 Allocation to Curriculum:


## 9 Responsibility/ Lecturer

*Prof. Dr. S. Engell/ Prof. Dr. S. Engell*