### Module title
Image and Signal Processing in Physics

### Abbreviation
11-BSV-122-m01

### Module coordinator
Managing Director of the Institute of Applied Physics

### Module offered by
Faculty of Physics and Astronomy

### ECTS
6

### Method of grading
Numerical grade

### Duration
1 semester

### Module level
Graduate

### Other prerequisites
Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.

### Contents
Periodic and aperiodic signals; principles of discreet and exact Fourier transformation; principles of digital signal and image processing; discretisation of signals/sampling theorem (Shannon); homogeneous and linear filters, convolution product; tapering functions and interpolation of images; the Parsival theorem, correlation and energetic observation; statistical signals, image noise, moments, stationary signals; tomography: Hankel and Radon transformation.

### Intended learning outcomes
The students have advanced knowledge of digital image and signal processing. They know the physical principles of image processing and are familiar with different methods of signal processing. They are able to explain different methods and to implement them, especially in the field of tomography.

### Courses
(V + R (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
(a) written examination (90 minutes) or (b) oral examination of one candidate each or oral examination in groups (approx. 30 minutes per candidate) or (c) project report (approx. 8 to 10 pages, time to complete: 1 to 4 weeks) or (d) presentation/seminar presentation (approx. 30 minutes)

Assessment offered: When and how often assessment will be offered depends on the method of assessment and will be announced in due form under observance of Section 32 Subsection 3 ASPO (general academic and examination regulations) 2009.

### Allocation of places
--

### Additional information
--

### Referred to in LPO I
(examination regulations for teaching-degree programmes)

### Module appears in
Bachelor' degree (1 major) Physics (2010)
Bachelor’ degree (1 major) Physics (2012)
Bachelor’ degree (1 major) Nanostructure Technology (2012)
Master's degree (1 major) Physics (2010)
<table>
<thead>
<tr>
<th>Degree</th>
<th>Major</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master's degree</td>
<td>(1 major) Physics</td>
<td>2011</td>
</tr>
<tr>
<td>Master's degree</td>
<td>(1 major) Nanostructure Technology</td>
<td>2011</td>
</tr>
<tr>
<td>Master's degree</td>
<td>(1 major) Nanostructure Technology</td>
<td>2010</td>
</tr>
<tr>
<td>Master's degree</td>
<td>(1 major) FOKUS Physics</td>
<td>2010</td>
</tr>
<tr>
<td>Master's degree</td>
<td>(1 major) FOKUS Physics</td>
<td>2011</td>
</tr>
</tbody>
</table>