

Title of course	Image Processing 1
Responsible instructor	<i>Prof. Dr. Klaus Chantelau</i>
Learning objectives	<p><i>Students should be able</i></p> <p><i>to analyse typical problems of the development of audio-visual digital formats</i></p> <p><i>to understand the foundations of the compression of audio-visual signals</i></p> <p><i>to understand the methods and the structure of audio-visual digital standards (G7xx, mp3, GIF/PNG, JPEG, H26x, MPEG1 / 2 / 4)</i></p> <p><i>to apply the most important mathematical and algorithmical methods for the development of compression software moduls</i></p>
Course contents	<i>Color Spaces, filtering processes, Fourier, DCT, and wavelet transform, image segmentation, motion estimation and image recognition. A method for data compression (entropy coding, transform coding, predictive coding), quantization, signal processing of the human visual system, motion prediction</i>
Teaching methods	<i>Blackboard lectures, PowerPoint slides, computer exercises.</i>
Prerequisites	<i>Fundamentals of Linear Algebra and Programming, the scope of the Bachelor Module Multimedia and Communications Systems.</i>
Suggested reading	<p><i>„Digitale Bildcodierung“ - Jens Rainer Ohm Springer 1995, ISBN 3-540-58579-6</i></p> <p><i>“A Wavelet Tour of Signal Processing” - Stephane Mallat Academic Press 1999, ISBN 0-12-466606-X</i></p> <p><i>„Bildverarbeitung für die Medizin“ - Lehmann et al. Springer 1997, ISBN3-540-61458-3</i></p> <p><i>“Coding and Information Theory” - Steven Roman Springer 1992</i></p> <p><i>„Digitale Fernsehtechnik: Datenkompression und Übertragung für DVB“ 2.Auflage - Ulrich Reimers Springer 1997, ISBN 3-540-60945-8</i></p>
Applicability	<i>Master Applied Computer Science, Master Angewandte Medieninformatik</i>
Workload	<i>Total 150 hours. Attendance: 60 hours, Self-Study: 45 hours, Exam Preparation 45 hours</i>
ECTS credit points and weighting factor	<i>5 CP (Emphasis of the Grade for the final Grade 5/120)</i>
Basis of student evaluation	<i>Written examination</i>
Time	<i>One semester</i>
Frequency	<i>Once during the academic year (winter semester)</i>
Duration	<i>1 semester</i>

Course type	<i>Elective course</i>
Remarks	Teaching language is English.