

Signals & Systems II					
Module Code	Workload 180 hrs.	Credits 6	Semester 2	Frequency of Module Only summer semester	Duration 1 Semester
1	Module Components	Teaching Language	Contact Hours	Self Study	Class Size
	a) Cryptology	a) English	a) 22,5 hrs.	a) 37,5 hrs.	a) 24
	b) Cryptology Exercise	b) English	b) 11,25 hrs.	b) 48,75 hrs.	b) 24
	c) Micro Optics	c) English	c) 22,5 hrs.	c) 37,5 hrs.	c) 24
2	<p>Learning Outcomes</p> <p>After successful participation in the module the student</p> <p>Knowledge (1) ... understands optical phenomena including Gaussian optics, optical interfaces and materials ... can recollect different elements used for crypto graphical or optical subsystems ... knows most widely used standards for cryptographic systems</p> <p>Comprehension (2) ... recognises safety or security components in given systems</p> <p>Application (3) ... can define the optical components in advanced diagnostic: micromirrors, refractive microlenses or waveguide optics ... can design reflective, geometric, diffractive and integrated optics ... can examine cryptographic protocols and evaluate their security</p> <p>Analysis (4) ... can examine the advantages of using active micro optical components ... can analyse systems that contain cryptographic or optical components ... can appraise the best micro-optical fabrication method for the specific application</p> <p>Evaluation (6) ... is aware of common threats and attacks on system</p>				
3	<p>Individual Component Content</p> <p>a) - design criterias for cryptographically secure systems - most common encryption processes - message security and message authentication - authentication and digital signatures - key generation, key negotiation, key transport and key management - standards and examples for common protocols, certificates and infrastructure</p>				

	<ul style="list-style-type: none"> c) - Introductions to optical materials and optical interfaces - Reflective micro-optics (reflection, planar and nonplanar mirrors, micro-mirrors, adaptive micro-optics) - Refractive micro-optics (lens fundamentals, imaging, primary and chromatic aberrations) - Diffractive micro-optics (diffraction, gratings, diffractive microlenses) - Guided-wave micro-optics (waveguides-ray optics models, waveguide characterization and components, optical fibers) - Active micro-optics (Light emitting diodes, photodetectors, phase and intensity modulator) - Tunable micro-optics (liquid and membrane microlenses)
4	<p>Teaching Methods</p> <ul style="list-style-type: none"> a) Lecture b) Practical c) Lecture
5	<p>Prerequisites</p> <p>Mathematics; Technical Optics</p>
6	<p>Methods of Assessment</p> <ul style="list-style-type: none"> b) Non Graded Assessment 1sbH (Written Elaboration) (1 LP) c) Non Graded Assessment 1sbL (Laboratory) (1 LP) <p>Modulprüfung Signals & Systems II 1K (Written Exam) (4 LP)</p>
7	<p>Applicability of Module</p> <p>Smart Systems M.Sc. (SMA)</p>
8	<p>Person Responsible for Module</p> <p>Prof. Dr. Paola Belloni (Module Responsible)</p> <p>Prof. Dr. Olaf Neisse (Module Responsible)</p>
9	<p>Reading List (Core Texts and Recommended Texts)</p> <ul style="list-style-type: none"> a) Stallings, William: Cryptography and network security : principles and practice, 5. ed., international ed., Prentice Hall 2011 b) Stallings, William: Cryptography and network security : principles and practice, 5. ed., international ed., Prentice Hall 2011 c) Hecht, H.: Optics, Addison-Wesley 2005 <p>Zappe, Hans P.: Fundamentals of micro-optics, Cambridge University Press 2010</p> <p>Herzig, Hans-Peter: Micro-Optics: Element systems and applications, Taylor & Francis Verlag, 1998</p>