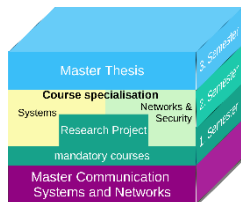


Master-Program Communication Systems and Networks

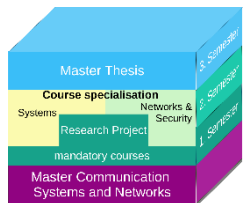
Faculty 07: Informations-, Media- and Electrical Engineering

Prof. Rainer Kronberger





- General Information about the Program
- Information from the Examination Service
- Information from the International Office

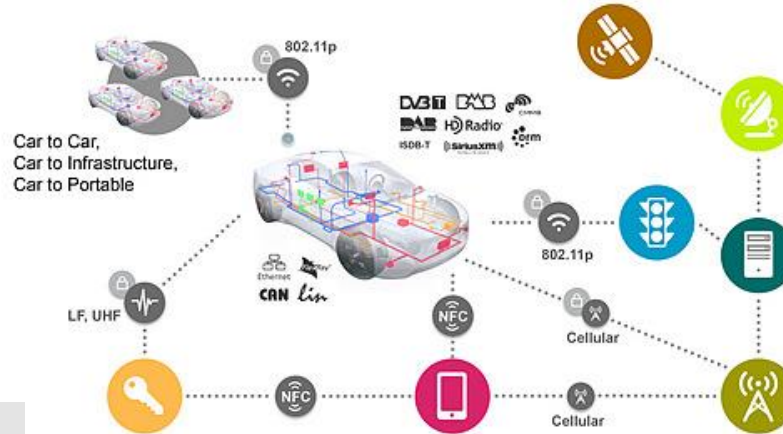


Communication Systems and Networks

A university program with perspective?



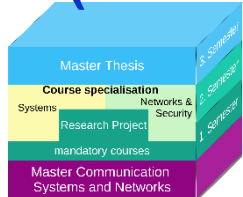
WLAN, Bluetooth



GSM, UMTS, LTE



**Smart Home
RFID
access control
automation
(medical) monitoring**



**Wireless
Communication Systems**

**4G, 5G, 6G
IoT**



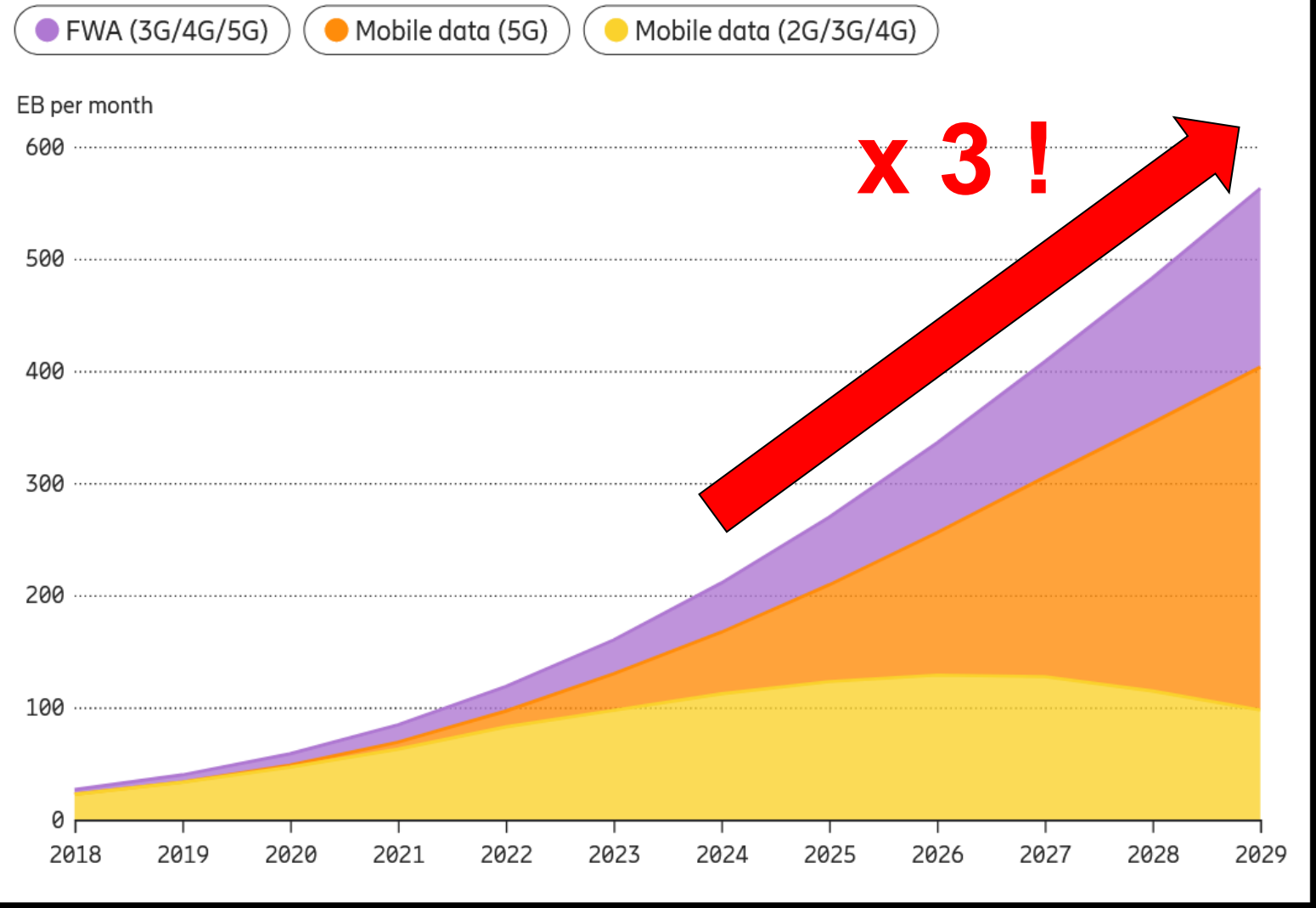
Audio & video broadcast



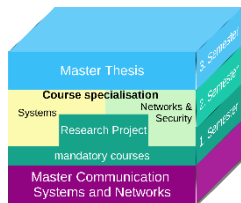
- Information- und communication technology has world wide a high importance in all areas of life

Communication Systems and Networks

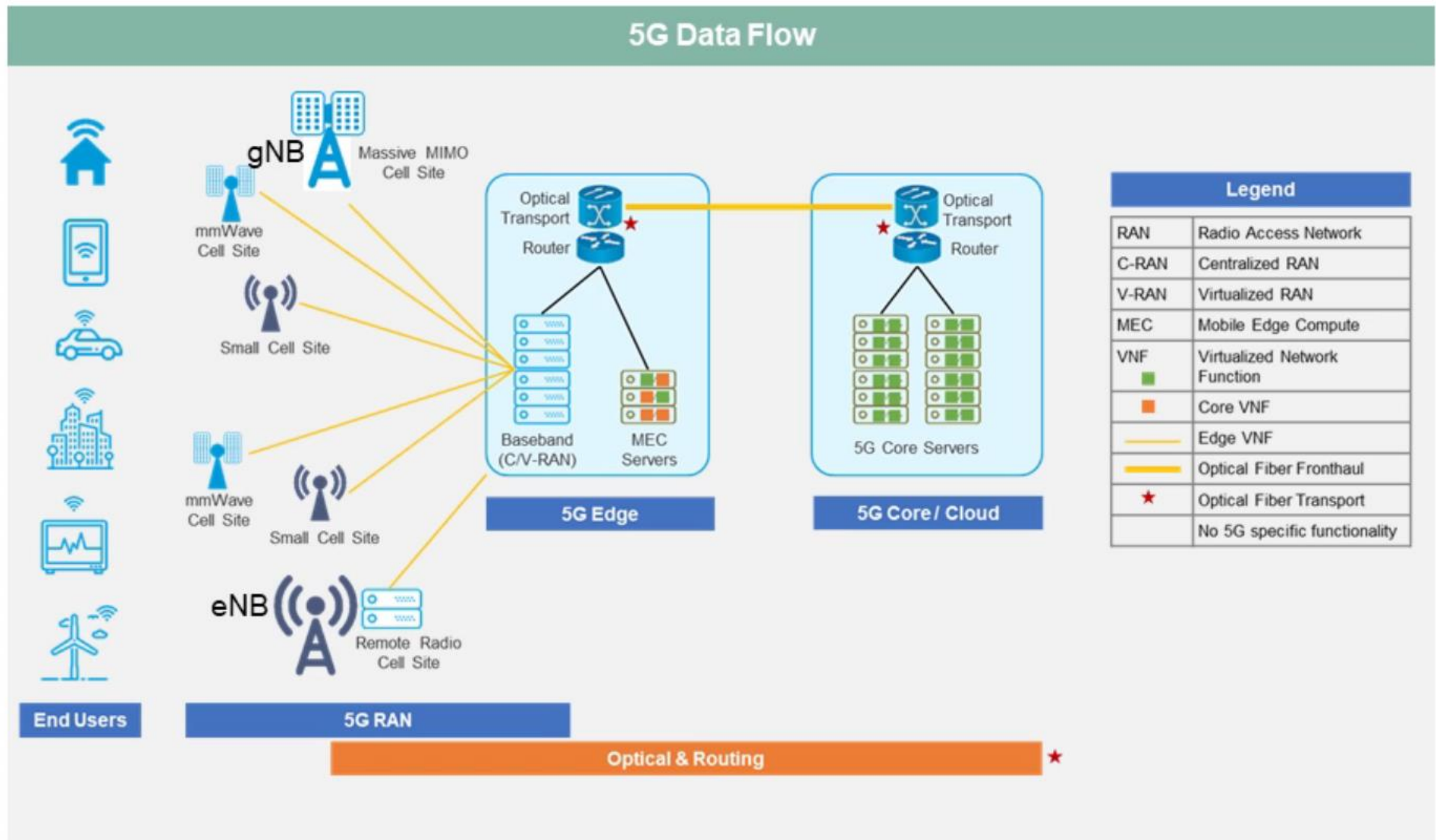
Figure 9: Global mobile network data traffic



Source: Ericson Mobility Report 2023



Communication Systems and Networks

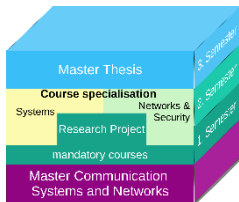


Source: Jim Nelson, „Power for Open Edge Applications“, OCP Summit, 2020.
5G Core=5G Backbone

Source: hindawi.com

A university program with perspective?

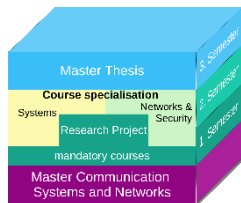
- Job possibilities worldwide in:
 - ⇒ telecommunication industry
 - ⇒ all other industries (IoT, Automotive, etc.)
 - ⇒ small and medium sized enterprises
 - ⇒ research institutes and universities (PhD possibility)
 - ⇒ public services (M.Sc → higher level)
- Significant higher earnings than B.Sc.



Communication Systems and Networks

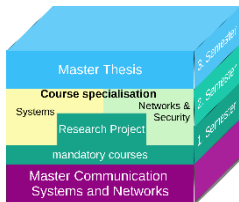
A university program with perspective?

- Great demand for master graduates! Currently, it is not covered!
- Fields of activity
 - ⇒ Design, development and implementation of modern communication systems and networks
 - ⇒ Development of devices, components, protocols and applications
 - ⇒ Evaluation and analysis of procedures and methods
 - ⇒ Assessment and evaluation of communication systems and standards
 - ⇒ Project management
 - ⇒ Sales and marketing of IT products
 - ⇒ Research at universities and institutes
 - ⇒ consulting and training of user and clients



Profile and Achievements

- focus of the study program:
 - consolidation of the theoretical knowledge in combination with practical scientific work
- nearly each module is supplemented by lab work
- students have to conduct an individual R&D work in the framework of a university or external research project to improve their scientific capabilities
- a broad range of further modules from the fields of electrical engineering, optical technologies, informatics, and media technologies is offered as electives by cooperation between TH-K and the H-BRS.



Requirements

■ Bachelor in

- Electrical / Telecommunication Engineering
- Information Engineering / Computer Science
- or similar programs

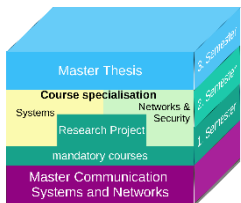
with at least 180 ECTS (additional assignments) resp. 210 ECTS

■ Major interests in Information and Communication Technologies

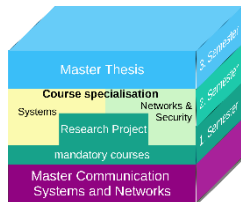
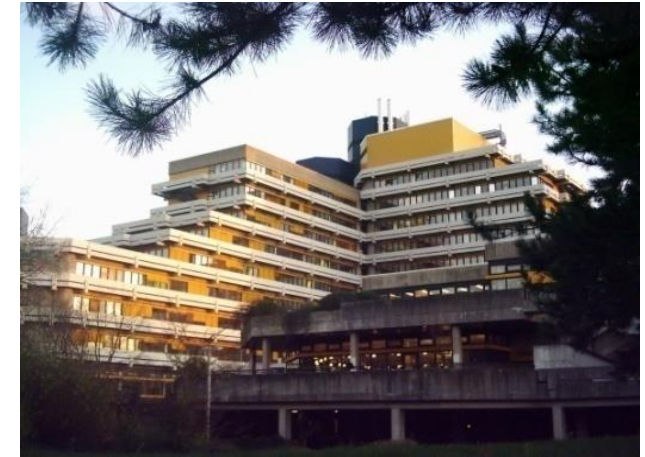
For all those of you who have got ***conditional admission***:

Please contact Prof. Kronberger (by mail) immediately to discuss your working plan for earning the missing credits!

(Provide name and student number in your mail!)

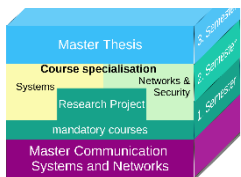
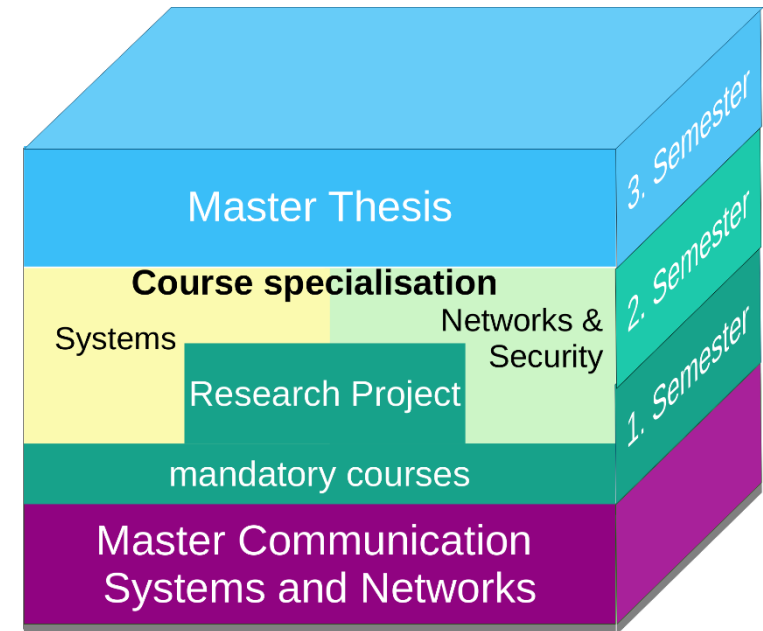


- **Faculty 07 (Institut for Communication Engineering INT), TH Köln**
 - Profs. Cremer, Dettmar, Elders-Boll, Grebe, Knospe, Kronberger, Pörschmann, Randerath, Rhein
- **Fachbereich Informatik, HS Bonn-Rhein-Sieg**
 - Rademacher, Tschofenig



MaCSN program structure

- **1. Semester: main subjects**
- **2 specialisations already starting 1. semester**
 - ⇒ *Communication Systems (E; TH-K)*
 - ⇒ *Communication Networks (D,E; TH-K, B-R-S (including IT-Security aspects))*
- **research project (10 ECTS)**
- **language**
 - ⇒ All courses in English at TH-K (lectures, excercises, projects, thesis)
 - ⇒ mainly German in HS BRS
- **Start**
 - ⇒ **regular summer term**
 - ⇒ start in winter term in October with changed schedule



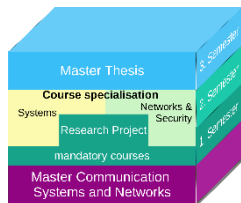
Curriculum

Regular start →
summer term

Start →
winter term

Module-ID	Module Name	Credits	
1. Semester			
HIM	Advanced Mathematics (In English) mandatory	5	No ULP
BSN	Basics on Systems and Networks mandatory	5	
PFM1	Profile Module 1 (3) of the corresponding specialisation	5	
PFM2	Profile Module 2 (4) of the corresponding specialisation	5	
EL1	Elective 1 (3) from Master modules with technical content	5	
PM	Project Management (In English) mandatory	5	No ULP
RP	Research Project mandatory	10	
2. Semester			
HIM	Advanced Mathematics (in German)	5	No ULP
PFM3	Profile Module 3 (1) of the corresponding specialisation	5	
PFM4	Profile Module 4 (2) of the corresponding specialisation	5	
EL2	Elective 2 (1) from Master modules with technical content	5	
EL3	Elective 3 (2) from Master modules		
PM (PL)	Projectmanagement/Projektleitung (in German)	5	No ULP
RP	Research Project	10	No ULP
3. Semester			
MAA	Master Thesis		
KOLL	Colloquium / Final Presentation	3	
offered in both Semester			

This is the minimum planned time! It is on you, what time you need/have to complete the program!



Specialisation courses

Profile: Communication Systems					
ACC	Advanced Channel Coding	E	K	SS	
DSP	Digital Signal Processing	E	K	WS	
ESD	Embedded Systems Design	E	K	SS	
KRY	Cryptography	E	K	SS	
RFSD	RF System Design	E	K	SS	
VAE	Virtual Acoustic Environments	E	K	SS	
MLWR	Maschine Learning and Scientific Computing	E	K	SS	
Profile: Communication Networks					
AMC	Advanced Multimedia Communications	E	K	SS	
ITF	IT-Forensik	E	K	WS	
KVS	Communication in Distributed Systems	E	B-R-S	SS	WS
NGN	Next Generation Networks	E	K	WS	
KRY	Cryptography	E	K	SS	
IST	IT Security	E	K	WS	
TNS	Selected Topics in Network Security	E/G	B-R-S	SS	
DAT	Delegated Authorization	E/G	B-R-S	WS	

G: German

B-R-S: St. Augustin

E/G

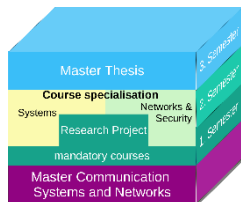
summer term: English, winter term: German

WS

winter term

SS

Summer term



Modules of the MA CSN

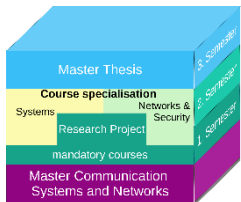
- The modules descriptions can be found in the WWW under <http://www.mcsn.de/> and then under the category **For Students**

- ✓ TH Köln follow the link

http://f07-studieninfo.web.th-koeln.de/f07_handbuecher_2020/html_pdf/SgVerzeichnis.html

- ✓ H Bonn-Rhein-Sieg follow the link

http://live-inf.h-brs.de/Aktuelles_Semester_MCSN.html



E-Learning MA CSN

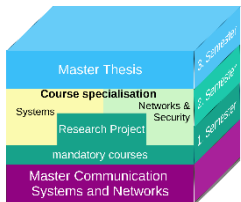
- Professors from TH Cologne provide course material and latest information in the E-Learning platform **ILU** of TH Cologne

See: <https://ilu.th-koeln.de/> and choose

Fakultät 07 https://ilu.thkoeln.de/ilias.php?baseClass=ilrepositorygui&ref_id=95

→ Lehrende → you will find the professors with the courses

- Please register for each course. Most courses require a PW, which will be given by the professor.
- Request access at HS B-R-S. System is different!



Class Schedules TH K

Monday

Tag	Std	Zeit	MACSN			
Mo	1	8:00				
Mo	2	8:50				
Mo	3	9:45	Dettmar	ACC	Oberheide	PLET
Mo	4	10:35	ZN 8-8	P	ZO 6-1	S
Mo	5	11:30	Dettmar	ACC	Oberheide	PLET
Mo	6	12:20	ZN 8-8	P	ZO 6-1	S
Mo	7	13:15			Knospe	V
Mo	8	14:05			KRY	V
Mo	9	15:00			ZO 6-8	Ü
Mo	10	15:50		P		P
Mo	11	16:45		Grebe		Knospe
Mo	12	17:35		NGN		KRY
Mo	13	18:30		ZO 8-7		ZO 6-10
Mo	14	19:20				

Tuesday

No Lectures at TH K ; only B-R-S

Wednesday

Mi	1	8:00				
Mi			Elders-Boll V	Kronberger	V	Dettmar V
Mi			BSN V	BSN	V	BSN V
Mi			ZW 7-2 Ü	ZW 7-2	Ü	ZW 7-2 Ü
Mi	5	11:30		Randerath	HIM	V ZW 8-3
Mi	6	12:20		Randerath	HIM	V ZW 8-3
Mi	7	13:15		Randerath	HIM	S ZW 8-3
Mi	8	14:05		Randerath	HIM	S ZW 8-3
Mi	9	15:00				Ladriere GER
Mi	10	15:50				Hörsaal 13 V
Mi	11	16:45		Seidel	CCNA3-4	Ladriere GER
Mi	12	17:35		ZW 8-3	P	Hörsaal 13 S
Mi	13	18:30		Seidel	CCNA3-4	Technology
Mi	14	19:20		ZW 8-3	P	Arts Sciences

V: Lecture Ü: Excercises P: LabWork

Thursday

Do	4	10:35				
Do	5	11:30	Dettmar	V		
Do	6	12:20	ACC	V		
Do	7	13:15	ZO 6-1	Ü		
Do	8	14:05				
Do	9	15:00				Grebe V
Do	10	15:50				NGN V
Do	11	16:45				ZO 8-6 Ü
Do	12	17:35				
Do	13	18:30	Krug	HIM		
Do	14	19:20	ZW 8-3	TUT		

Friday

Fr	1	8:00				
Fr	2	8:50	Cremer	ESD		
Fr	3	9:45	ZS 6-1	V	Kronberger	V
Fr	4	10:35	Cremer	ESD	RFSD	V
Fr	5	11:30	ZS 6-1	Ü/P	ZW 8-3	Ü
Fr	6	12:20				
Fr	7	13:15			Pörschmann	V
Fr	8	14:05			VAE	V
Fr	9	15:00			ZW 8-3	Ü
Fr	10	15:50			Erkan	PM
Fr	11	16:45			ZO 6-8	V
Fr	12	17:35			Erkan	PM
Fr	13	18:30			ZO 6-8	V
Fr	14	19:20				

Further information about the lecture time schedule:

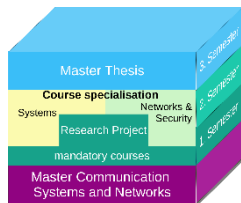
https://ilu.th-koeln.de/ilias.php?baseClass=ilrepositorygui&cmd=sendfile&ref_id=462908

Information about courses in SS 2025

Please look up/find the courses under the name of the professors in ILU (**registration required!**)

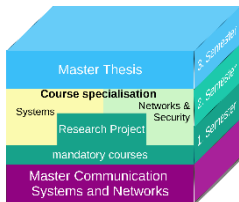
https://ilias.th-koeln.de/goto.php?target=cat_62623&client_id=ILIAS_FH_Koeln

- KRY Cryptography (**Prof. Knospe**)
First lecture: Monday., March 17, 13.15,
(mandatory course for IT-Security in winter term!)
- BSN (**Profs. Dettmar / Elders-Boll /Kronberger**)
Wed. 19. March, 09.00 , see also Info in ILU
- HIM Advanced Mathematics (**Prof. Randerath**)
First lecture, Wed., March 19, 11.30
- NGN Next Generation Networks (**Prof. Grebe**)
First lecture, Thur., March 20, 15.00



Information about courses at TH-K (summer term)

- VAE Virtual Acoustic Environments ([Prof. Pörschmann](#))
First lecture, Friday, 21. March, 13.15
- ACC Advanced Channel Coding ([Prof. Dettmar](#))
First lecture, Thursday, 20. March, 11.30
- ESD Embedded System Design ([Prof. Cremer](#))
First lecture: Friday, March 21, 09.00, Later in groups with individual timing!
- RFSD Radio Frequency System Design ([Prof. Kronberger](#))
First lecture, **Friday 28. March**, 09.45
- PM Project Management (English, Dr. Erkan)
(register course in [Prof. Dettmar](#))
First lecture, **Friday 28. March** 16.30
Attention: You have to register in ULP-PSSO



E-Learning MA CSN

- Professors from TH Cologne will present course material and important information in the E-Learning platform **ILU**

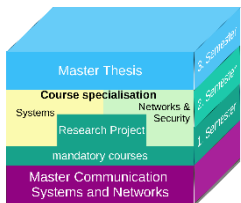
See: https://ilu.th-koeln.de/goto.php?target=root_1&client_id=thkilu
and choose

Fakultät 07 https://ilu.th-koeln.de/goto.php?target=cat_95

Go to **\Lehrende** https://ilu.th-koeln.de/goto.php?target=cat_58604

Go to **\Professor Name** and you will find the course. Please register for each course. Most courses require a PW, which will be given by the professor.

- Request access at HS B-R-S. System is different!



Course schedule B-R-S WS 24/25

Timetable of Semester MKSN

Semester: Sommersemester 2025, **Calendar Weeks:** 14-27, **Weekdays:** Monday-Sunday, **As of:** 2025-03-18 19:38:04

The table does not show events that lie in the past.

	from	until	Room	Activity	Period	Who
Tue	10:45	13:15	St-C119	Communication in Distributed Systems (VÜ)	01.04.2025-01.07.2025 (KW 14-27)	Rademacher
	13:30	16:45	St-C115	Selected Topics in Network Security (VÜ)	01.04.2025-01.07.2025 (KW 14-27)	Tschofenig


(KW = Calendar Week, gKW = even calendar weeks, uKW = odd calendar weeks)

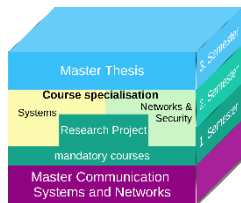
Both lectures in mixed German/English language

Further information about the lecture time schedule:

HS Bonn-Rhein-Sieg (FB Informatik) <https://eva2.inf.h-brs.de/stundenplan/>

For course registration: <https://infoportal.inf.h-brs.de/app1/de/reg/>

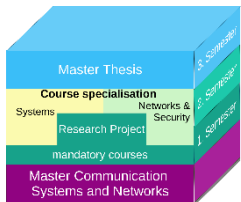
 **mandatory!**



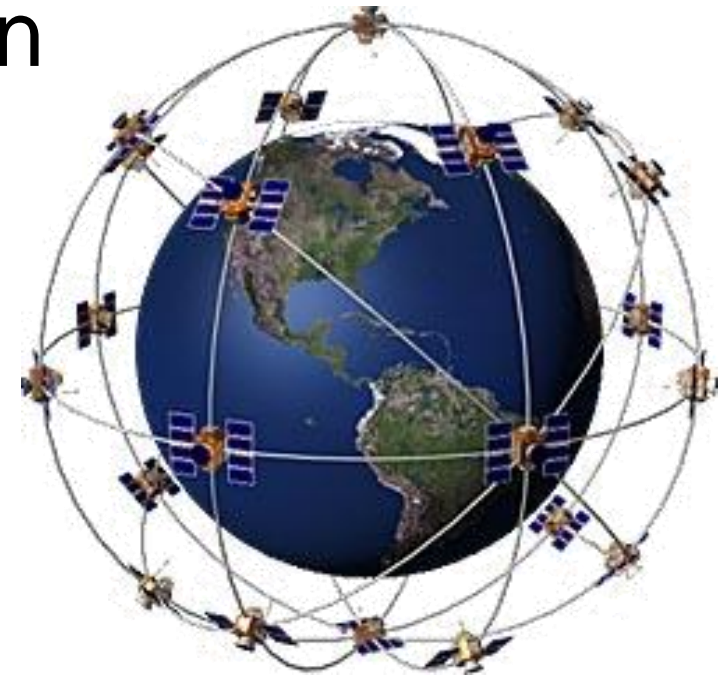
2 Double Degree Programs with

- Polytechnical University of Valencia UPV
- Polytechnical University of Madrid UPM
- Students have to acquire 90 ECTS credits in total during their studies at both Universities in the respective Master programs.
- Courses during one or two semester in Köln and one semester in Valencia / Madrid and afterwards final thesis in Köln or Valencia / Madrid
 - UPV courses in Spanish, some in English
 - UPM all courses in English

For further information: Prof. U. Dettmar
Application deadline!



Orientation at TH Koeln



Room-Name

Building, Direction (**N, O, S, W**), level, Room -Nr.

for example ZW 7 – 2 is in the main building, Westwing, 7. floor, room 2)

Important rooms

2. Floor

Entrance, Offices for Examination/ Application

Main Lecture Room AM (Audimax), Lecture rooms 7 - 14

Student Council (AstA) and Mensa

6. Floor

ZO 6 – 5 = Student council Communications Engineering

ZN 6 – 18 = Secretary / Dean

ZO 6 – 6, ZO 6 – 10, ZW 6 – 1, ZS 6 – 1 Lecture rooms

7. Floor

ZW 7 – 2 = Lecture room

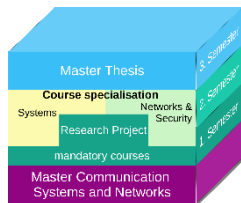
8. Floor

North : Laboratories for Telecommunication (Prof. Dettmar, Prof Elders-Boll)

East: Network Lab (Prof. Grebe)

West: Acoustic Lab (Prof. Pörschmann), HighFrequency Lab (Prof. Kronberger)

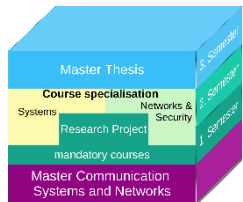
ZW 8-3 u. ZO 8-6: Lecture Rooms



Important Information about Research Project

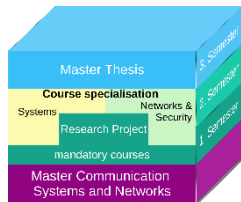
Fakultät 07 Informations-, Medien- und Elektrotechnik

Prof. Rainer Kronberger



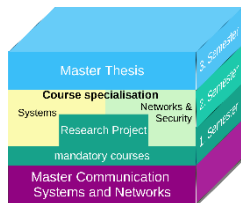
Important Facts

- **10 ECTS / 300h workload**
- **1st and/or 2nd semester**
- **Theoretical and/or practical work**
- **Will be supervised by participating professors**
- **Can also be done in industry, but **only with permission and involvement of a professor !****



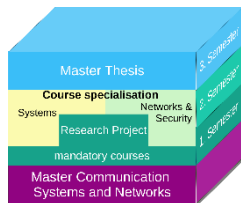
What is a Research Project?

- **Research projects are offered by participating professors each semester .**
 - The student is fully responsible by himself to look for a research project!
 - The topic of the project should be in the personal area of interests of the student!
 - The student may offer the professor own topics or wishes (in the field of research of the professor / laboratory)
- **Within the project, the student shall**
 - work individually on a research topic
 - analyze a problem in a scientific way
 - find new or suitable solutions to solve the problem
 - plan the project in a scientific way
 - do experiments, simulations and/or theoretical work
 - evaluate the results
 - present the results and write a report



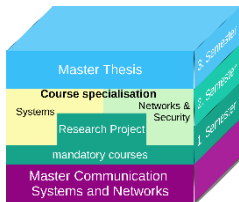
Time, work schedule and evaluation(1)

- Research project can be started any time either in SS or in WS
- research project starts with introduction phase (4 – 6 weeks)
 - student chooses the topic of the research project
 - student gets familiar with the problem
 - student works theoretically to understand the problem
- student gives a presentation about the topic, the problem and shows first ideas and solutions (after 1 - 2 months)
 - will be presented together with other students
 - student gives a short summary (2 pages)
 - presentation and summary will be evaluated (25%)
- **When you have started your RP, you have maximum 12 months to finish!**
Hard deadline! Otherwise you will fail!



Time and work schedule and evaluation(2)

- **main research work continues**
 - lab work (6 - 8h / week = 1 full day or 2 x half days /week !)
- **work can be done either during the semesters only but also during the semester break in one block (e.g. totally 7 - 8 weeks fulltime)**
- **final presentation at the end of the project**
 - will be presented together with other students
 - student gives a project report (max. 10 pages)
 - presentation and report will be evaluated by the professor(s)
- **total grading:**
 - 25% from first presentation
 - 40% overall performance of research work
 - 25% final presentation
 - 10% final report



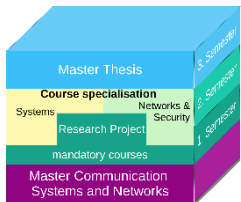
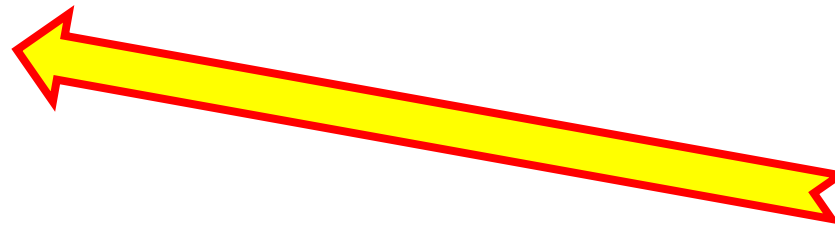
Course Registration - Exam Registration

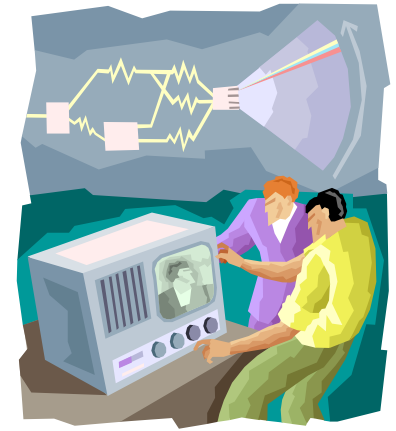
- You will get an additional and detailed Information from the examination office about the **PSSO Examination Registration Software**.

Some important hints, for now:

- Register in ILIAS courses (find course under Prof. name)
- Register in the PSSO for the ULP ! **DO NOT MISS!**
If course has a **ULP**, this is **mandatory**! Otherwise you cannot register for the course exam! Registration for ULP **afterwards not possible!**
- Register in the PSSO until given deadline for the course exam!
Exam withdrawel possible until one week before exam!

Special Introduction in PSSO: Wed. 26.March 2025, 10.45 after BSN lecture!





Find further information under

<http://www.mcsn.de/>

or

TH-Köln: Prof Rainer Kronberger, Room ZW 8-14

Office hours: by request per mail

HS Bonn-Rhein Sieg: Prof. Rademacher

