**Master Program**

**Information and Communication Engineering (M.Sc.)**

Date: 2022-02-07

**Study plan (Annex I)**

### Key

<table>
<thead>
<tr>
<th>Performance category</th>
<th>Type of examination</th>
<th>Course</th>
<th>Semester</th>
</tr>
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<tbody>
<tr>
<td>SWS:</td>
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</table>

**TUCaN-number and credit points of module building blocks only have informative character.**

All crediting processes of the CP are performed after the module is completed.

1. **Mandatory**

### 2. Optional Fundamentals (min. 10 CPs); Cancellation of modules compliant to Typ §30, Abs. 5 APB

### 3. Options (min. 38 CPs; min. 3 selected subareas with at least 10 CPs per subarea); Cancellation of modules compliant to Typ §30, Abs. 5 APB; from open sub-areas only one module in total

### 3.1 Device Technology and Circuit Design

### 3.2 Seminars and Project Seminars

### 3.3 Lecture Courses

### 3.4 Lectures and Practical Courses

### 3.5 Professional Seminars

### 3.6 Lectures and Practical Courses

### 3.7 Project Seminars

### 3.8 Lectures and Practical Courses

### 3.9 Colloquia

### 3.10 Lectures and Practical Courses

### 3.11 Lectures and Practical Courses

### 3.12 Lectures and Practical Courses

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### 3.200 Lectures and Practical Courses
Master Program
Information and Communication Engineering (M.Sc.)

Date: 2022-02-07
Study plan (Annex I)

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TUCaN-number and credit points of module building blocks only have informative character. All cредящих processes of the CP are performed after the module is completed.

### 3.2 Electronic System Design

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<thead>
<tr>
<th>Course</th>
<th>Type of examination</th>
<th>Course</th>
<th>Semester</th>
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<tbody>
<tr>
<td>18-bo-2200</td>
<td>Computer Aided Design for SoCs (V2 + U1 + P1)</td>
<td>FP St s 90</td>
<td>4 f 5 5</td>
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<tr>
<td>18-hb-2030</td>
<td>Computer Systems II (V3 + U1)</td>
<td>FP St m 60</td>
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<tr>
<td>18-su-2020</td>
<td>Real-Time Systems (V3 + U1)</td>
<td>FP St f 4</td>
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<td>18-hb-2010</td>
<td>Low-Level Synthesis (V3 + U1)</td>
<td>FP St m 30</td>
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<td>18-hb-2020</td>
<td>High-Level Synthesis (V3 + U1)</td>
<td>FP St m 30</td>
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<td>Microprocessor Systems (V2 + U1)</td>
<td>FP St s 90</td>
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<td>18-bo-2130</td>
<td>Project Seminar Design for Testability (P3)</td>
<td>SL St m 30</td>
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<td>18-hb-2160</td>
<td>Seminar Integrated Electronic Systems Design A (S2)</td>
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<td>18-bo-2161</td>
<td>Seminar: Integrated Electronic Systems Design B (S3)</td>
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<td>Seminar Software System Technology (S2)</td>
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<td>HDL Lab (Pr2)</td>
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<td>Embedded Systems Hands-On 2: Entwurf von Hardware-Beschleunigern für Systemen (Ch2)</td>
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<td>Advanced Concepts in Embedded Systems and Applications (PP6)</td>
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<td>Embedded Systems Hands-On 2: Entwurf von Hardware-Beschleunigern für Systemen (Ch2)</td>
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<td>18-bo-2020</td>
<td>Computer Aided Design for Integrated Circuits (V2 + U1)</td>
<td>FP St s 90</td>
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<td>18-su-2030</td>
<td>Model-Based Software Development Lab (P2)</td>
<td>SL St m 30</td>
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### 3.3 Communication Technology

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<tbody>
<tr>
<td>18-ec-2010</td>
<td>Adaptive Filters (V3 + U1)</td>
<td>FP St f 4</td>
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<td>18-jk-2020</td>
<td>Antennas and Adaptive Beamforming (V3 + U1)</td>
<td>FP St f 4</td>
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<td>Computer Vision in Engineering (V2 + U1)</td>
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<td>18-jk-2010</td>
<td>Microwave Engineering II (V3 + U1) (formerly: 18-ku-2040)</td>
<td>FP St s 90</td>
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<td>18-pe-2070</td>
<td>Matrix Analysis and Computations (V3 + U1)</td>
<td>FP St f 4</td>
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<tr>
<td>18-jk-2090</td>
<td>Microwave Measurement Technologies (V2 + U1 + Pr1)</td>
<td>FP St m 45</td>
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<td>18-kc-2030</td>
<td>MIMO – Communication and Space-Time-Coding (V2 + U1)</td>
<td>FP St s 120</td>
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<td>18-ec-2090</td>
<td>Robust Signal Processing With Biomedical Applications (V3 + U1)</td>
<td>FP St s 180</td>
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<td>18-ec-2070</td>
<td>Speech and Audio Signal Processing (V2 + U1 + S1)</td>
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<td>18-pr-2010</td>
<td>Terahertz Systems and Applications (V2 + U1)</td>
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<td>18-dg-1000</td>
<td>Electromagnetics and Applications I (V2)</td>
<td>FP St m 30</td>
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<td>18-ec-2040</td>
<td>Advanced Topics in Statistical Signal Processing (S4)</td>
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<td>18-jk-2050</td>
<td>Project Seminar Advanced µWave Components &amp; Antennas (P4)</td>
<td>SL St m 30</td>
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<td>18-ec-2040</td>
<td>Project Seminar Advanced µWave Components &amp; Antennas (P4)</td>
<td>SL St m 40</td>
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<td>Project Seminar Advanced µWave Components &amp; Antennas (P4)</td>
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<td>18-sc-1090</td>
<td>Microwave and Millimeter-Wave CAD (P4) (formerly: 18-dg-1060)</td>
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<td>Project Seminar Advanced µWave Components &amp; Antennas (P4)</td>
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<td>Digital Signal Processing Lab (Pr3)</td>
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<td>18-sc-1010</td>
<td>Software Lab Computational Electromagnetics and Applications I (Pr3) (formerly: 18-dg-1041)</td>
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**Information and Communication Engineering (M.Sc.)**

The allocation of courses/examinations is mandatory only if the course status is marked with "•".

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**3.4 Communication Systems**

18-zo-2090 Robust Signal Processing With Biomedical Applications (V3 + U1) FP St s 120 4 f 6 6
18-ku-2080 Optical Communications 3 – Seminar WDM Lab (S2) SL St m 30 2 f 4 4
18-ku-2220 Nonlinear Optics (V2) SF PP St s 90 2 f 3 3
18-jk-2070 Microwave Sensors (V2 + U2) SL PP St s 30 4 f 5 5
18-ku-2070 Optical Communications 2 – Systems (V2 + U1) 1SF PP St s 90 3 f 4 4
18-zo-2080 Advances in Digital Signal Processing: Imaging and Image Processing (V2 + U2) 1SF PP St f 4 f 5 5

**3.4 Communication Systems**

1. Mandatory

All crediting processes of the CP are performed after the module is completed.

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**18-se-2010 Acoustics I (V2)**

**18-pe-2020 Convex Optimization in Signal Processing and Communications (V2 + U1 + Pr1)**

**18-ku-2080 Information Theory I (V3 + U1)**

**18-ku-2110 Information Theory II (V3 + U1)**

**18-ku-2110 Machine Learning in Information and Communication Technology (ICT) (V2 + U1 + Pr1)**

**18-jk-2090 Microwave Measurement Technologies (V2 + U1 + Pr1)**

**18-ku-2080 Electrical Measurement Technologies (V2 + U1 + Pr1)**

**18-ku-2070 MIMO - Communication and Space-Time-Coding (V2 + U1)**

**18-kI-2020 Mobile Communications (V3 + U1)**

**18-jk-2040 Radar Techniques (V2)**

**18-kI-2040 Project Seminar Wireless Communications (Pj4)**

**18-kt-2010 Praktikum Kommunikationstechnik und Sensorsysteme (Pr3) (vormals: 18-jk-2050)**

**18-ku-2060 Sensor Array Processing and Adaptive Beamforming (V2 + U1)**

**18-pr-2020 International Summer School “Microwaves and Lightwaves” (S2)**

**18-pr-2080 Graph signal processing, learning and optimization (V3 + U1)**

**18-ku-2010 Artificial Intelligence in Medicine Challenge (Pj4)**

**18-ad-2110 Automated Driving (V2)**

**18-6-2020 Control of Distributed Cyber Physical Systems (V2 + U1)**

**18-ad-2130 Optimierung in Multigitätsystemen (V2 + U1)**

**18-jk-2080 European Microwave School (S2)**

**18-jk-2100 Ausgewählte Themen der Radiotechnik (V2) (vormals: 18-da-2020)**

**18-jk-2030 Terrestrial and Satellite-based Radio Systems (V3 + U1)**

**18-kI-2060 Simulation and Modeling Techniques and Tools for Mobile Communications Systems (V2)**

**18-ku-2070 Optical Communications 2 – Systems (V2 + U1)**

**18-ku-2080 Optical Communications 3 – Seminar WDM Lab (S2)**

**3.5 Communication Science and Media Technology**

**18-ku-2110 Machine Learning in Information and Communication Technology (ICT)**

**20-00-0056 Network, Traffic and Quality Management for Internet Services (V2)**

**20-00-0512 Network Security (IV4)**

**20-00-0053 Project on Secure Mobile Networking (Pr6)**

**20-00-0566 Serious Games (IV4)**

**18-sm-2280 Software Defined Networking (V2 + U2) (vormals 18-hh-2050)**

**20-00-0120 TK3: Mobile/Ubiquitous Computing (IV4)**

**TUCaN-number and credit points of module building blocks only have informative character.**

All crediting processes of the CP are performed after the module is completed.
### Key

<table>
<thead>
<tr>
<th>Performance category</th>
<th>Grading system</th>
<th>Type of examination</th>
<th>Duration</th>
<th>Weighting scheme</th>
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<tr>
<td>FP = Fachprüfung (lecture examination); SL = Studienleistung (examination)</td>
<td>St = Standard (graded); bnb = pass / fail (without grade)</td>
<td>s = written exam; m = oral examination; f = facultative (i.e., either written exam or oral examination - decided per semester); m/s = same as f; H = Seminar paper; R = Presentation; SF = Special type</td>
<td>Duration of the examination in minutes (optional)</td>
<td>For courses = Weighting of the grade for calculation of the module grade; For modules = Weighting of the module grade for the final grade</td>
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### TUCaN-number and credit points of module building blocks only have informative character.

All crediting processes of the CP are performed after the module is completed.

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### Master Program

**Information and Communication Engineering (M.Sc.)**

#### Date: 2022-02-07

**Study plan (Annex I)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Performance category</th>
<th>Grading System</th>
<th>Type of examination</th>
<th>Course Duration (minutes)</th>
<th>Weighting scheme</th>
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<td>Ubiquitous computing in business processes (V2)</td>
<td>FP</td>
<td>St</td>
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<tr>
<td>Multimedia Communications Seminar II (S2)</td>
<td>SL</td>
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<tr>
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<td>SL</td>
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<td>3 f</td>
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<tr>
<td>Lab Exercise on Secure Mobile Networking (Pr4)</td>
<td>SL</td>
<td>St</td>
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<td>4 f</td>
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<tr>
<td>Multimedia Communications Project II (Pr6)</td>
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<td>f</td>
<td>6 f</td>
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<tr>
<td>Visual Computing Lab (Pr4)</td>
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<td>4 f</td>
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<tr>
<td>Relativistic Electrodynamics (V2 + U2)</td>
<td>FP</td>
<td>St</td>
<td>m</td>
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<tr>
<td>Fundamentals of Reinforcement Learning (V2 + U1)</td>
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<td>St</td>
<td>m/s</td>
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<tr>
<td>Automatisierter Fahren (V2)</td>
<td>FP</td>
<td>St</td>
<td>s</td>
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<td>Mobile Sensing (V2 + U2)</td>
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<td>Smart Networks Lab (Pr3)</td>
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<td>Wireless Sensor Networks Lab (Pr4)</td>
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<td>Bookkeeping (V2 + TT1)</td>
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<td>Introduction to Business Management (V2)</td>
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<td>s</td>
<td>2 f</td>
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</tr>
<tr>
<td>Introduction to Economics (V2)</td>
<td>FP</td>
<td>St</td>
<td>s</td>
<td>2 f</td>
<td>3</td>
</tr>
<tr>
<td>German Language I (V2)</td>
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<td>s</td>
<td>2 f</td>
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<tr>
<td>German Language II (V2) (mandatory for student without DSH-2 or equil. qualif.)</td>
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<td>s</td>
<td>2 f</td>
<td>3</td>
</tr>
<tr>
<td>Other Language Course (V2) (mandatory for student with DSH-2 or equil. qualif.)</td>
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<td>St</td>
<td>s</td>
<td>2 f</td>
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<tr>
<td><strong>IT in Engineering, Computer Science, Mathematics, and Physics</strong></td>
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<tr>
<td><strong>All modules not already listed above and offered by Dept. (FB) 4-13 or 16-20</strong></td>
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</tbody>
</table>

#### Footnote 1:

Modules marked with **)" and in italics are currently inactive.

#### Footnote 2:

Modules of other departments that should be selectable by the students are dynamically included in certain areas. Our department has no