

# Selection table *Materials Specialization I & II – WS 22/23* Master Program Materials Science

## Basic rules:

Two topics must be chosen. Each must be studied with 12 to 18 CP. Total sum on both 30 CP. Within a topic, rules apply as stated in the table:

|   |   |       |       | Turnus                | Next begin |
|---|---|-------|-------|-----------------------|------------|
| <b>Topic: Advanced Materials Characterization</b> |   |       |       |                       |            |
|   | Solid State Spectroscopy (Dressel/Keimer)   | 9 CP  | opt.  | SS                    | 2023       |
|   | Diffraction Methods in Materials Science (Zotov)  | 6 CP  | opt.  | SS                    | 2023       |
|   | Physikalische Chemie III (Statistische Thermodynamik, Streu- und Diffraktionsmethoden mit Übung und Praktikum) (Gießelmann) | 12 CP | opt.  | SS                    | 2023       |
|   | High Resolution and Analytical Microscopy (Stender/Schmitz)   | 6 cp  | opt.  | WS                    | 2022       |
| <b>Topic: Functional Materials</b>                |   |       |       |                       |            |
|   | Liquid Crystals (Gießelmann/Laschat)  | 6 CP  | opt   | WS every two years    | 2022       |
|   | Semiconductor Physics (Weis)  | 9 CP  | opt.  | WS over two Semesters | 2022       |
|   | Advanced Experimental Physics (Wrachtrup/Bechinger)   | 9 CP  | opt.  | WS                    | 2022       |
|   | Advanced Condensed Matter Physics (Wrachtrup)   | 6 CP  | opt.  | SS                    | 2023       |
|   | Materials for Energy Technologies (Clemens)   | 6 CP  | opt.  | SS                    | 2023       |
|   | Polymer Electronics (Ludwigs)   | 3 CP  | opt.  | WS                    | 2022       |
|   | Bioinspired Approaches in Materials Science (Bill)  | 6 CP  | opt.  | SS every two years    | 2023       |
| <b>Topic: Inorganic Materials Chemistry</b>       |   |       |       |                       |            |
|   | Inorganic Materials Chemistry for Material Scientists (Niewa)   | 12 CP | comp. | WS over two Semesters | 2022       |

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|---|--|------|------|--------------------------|------------|
|   | Solid State and Materials Chemistry (Niewa)                      | 6 CP | opt. | SS                       | 2023       |
|   | Advanced Inorganic Synthesis Chemistry (Niewa)                   | 6 CP | opt. | WS                       | 2022       |
| <b>Topic: Materials Theory and Simulation</b> |  |      |      |                          |            |
|   | Computational Chemistry (Kästner/Köhn)                           | 6 CP | opt. | WS/SS over two Semesters | 2022       |
|   | Methoden der Werkstoffsimulation (Schmauder)                     | 6 CP | opt  | WS                       | 2022       |
|   | Molecular Quantum Mechanics (Kästner/Köhn)                       | 6 CP | opt  | SS                       | 2022       |
|   | Advanced Condensed Matter Physics (Wrachtrup/Bechinger)          | 6 CP | opt. | SS                       | 2023       |
|   | Solid State Theory (Büchler)                                     | 9 CP | opt. | SS                       | 2023       |
|   | Material design by ab-initio methods (Grabowski)                 | 6 CP | opt. | WS                       | 2022       |
|   | Computergestützte Materialwissenschaft                           | 6 CP | opt. | WS                       | 2022       |
| <b>Topic: Metals and Structural Materials</b> |  |      |      |                          |            |
| 6CP   | Schadenskunde (Seidenfuß)  | 3 CP | comp | WS                       | 2022       |
|   | Fügetechnik (Seidenfuß)  | 3 CP | comp | SS                       | 2023       |
|   | Grundlagen der Keramik und Verbundwerkstoffe                     | 6 CP | comp | WS&SS                    | 2022/2023  |
|   | Intermetallics and Superalloys                                   | 6 CP | comp | SS                       | 2023       |
|   | Diffraction Methods in Materials Science (Zotov)                 | 6 CP | opt. | SS                       | 2023       |
|   | Werkstoffe und Fertigungstechnik technischer Kohlenstoffe (Kern) | 3 CP | opt  | WS&SS                    | 2022/2023  |

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|---|---|------|-------|---------------------|---------------------|
|   | Werkstoffeigenschaften (Klenk)  | 6 CP | opt.  | SS                  | 2023                |
|   | High Resolution and Analytical Microscopy (Stender/Schmitz)           | 6CP  | opt.  | WS                  | 2022                |
|   | Laboratory course electron microscopy (Schmitz)                       | 3CP  | opt.  | SS                  | as per announcement |
| <b>Topic: Nanomaterials and Nanostructures</b>      |   |      |       |                     |                     |
|   | Fundamentals of Microelectronics (Burghartz)                          | 6CP  | opt.  | SS                  | 2023                |
|   | Advanced CMOS Devices and Technology                                  | 6CP  | opt.  | SS                  | 2023                |
|   | Nanomaterials (Schmitz)   | 6 CP | opt.  | WS every two years) | 2023                |
|   | Thin film materials and coatings (Schmitz/Richter)                    | 3 CP | opt.  | WS                  | 2022                |
|   | Emulsionen & Schäume  | 3CP  | opt.  | SS                  | 2023                |
|   | Nanopartikel und Nanomotoren: Eigenschaften und Materialien           | 3CP  | opt.  | SS                  | -                   |
| <b>Topic: Plastics Engineering (only in German)</b> |   |      |       |                     |                     |
|   | Kunststofftechnik - Grundlagen und Einführung (Bonten)                | 6 CP | comp. | WS                  | 2022                |
|   | Charakterisierung und Prüfung von Polymeren und Kunststoffen (Bonten) | 3 CP | Comp. | WS                  | 2022                |
|   | Faserkunststoffverbunde (Kreutzbruck)                                 | 3CP  | Comp. | SS&WS               | 2022                |
|   | Kunststoffaufbereitung und Kunststoffrecycling (Kroh/Bonten)          | 3 CP | opt.  | WS                  | 2022                |

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|--|---|------|------|---------------------|---------------------|
| <b>Topic: Soft Matter and Biomaterials</b> |   |      |      |                     |                     |
|  | Liquid Crystals (Gießelmann/Laschat)                        | 6 CP | opt. | WS every two years) | 2022                |
|  | Polymer Electronics   | 3CP  | opt. | WS                  | as per announcement |
|  | Bioinspired Approaches in Material Science (Bill)           | 6 CP | opt. | SS every two years) | 2023                |
|  | Emulsionen & Schäume  | 3CP  | opt. | SS                  | 2023                |
|  | Nanopartikel und Nanomotoren: Eigenschaften und Materialien | 3CP  | opt. | SS                  | -                   |