

**Module catalogue**  
**for the Master study**  
**Complex Condensed Materials and Soft Matter**  
**University of Regensburg**

The Master study Complex Condensed Materials and Soft Matter at the University of Regensburg contains the following modules:

1. Compulsory Elective Part:

- COSOM-M 01: Module Inorganic Chemistry
- COSOM-M 02: Module Organic Chemistry
- COSOM-M 03: Module Bioanalytical Chemistry

2. Compulsory Part:

- COSOM-M 04: Module Formulation
- COSOM-M 05: Module Condensed Matter
- COSOM-M 06: Module Colloidal Chemistry
- COSOM-M 07: Module Preparing for Master Thesis
- COSOM-M 08: Module Master Thesis

## 1. COMPULSORY ELECTIVE PART:

The student has to choose two modules from the compulsory elective part.

### COSOM-M 01

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| <b>1. Module Name:</b>   | Module Inorganic Chemistry   |
| <b>2. Field / Person in Charge:</b>  | Chemistry / Prof. Dr. Arno Pfitzner  |
| <b>3. Synopsis:</b>  | <p>Lectures for this basic module will be given in the fields of inorganic molecular chemistry, solid state chemistry, material chemistry, bioinorganic chemistry, and methods of inorganic chemistry. The student will choose some topics out of this field. Lectures will provide deeper exemplary insight in current topics and new trends in inorganic chemistry.</p> <p>Preparative Inorganic Lab, accompanying seminar and seminar with oral presentations for advanced students: The preparative lab will provide advanced techniques in molecular- and coordination chemistry as well as solid state chemistry with special regard of specialized synthetic methods.</p>             |
| <b>4. Competences Acquired:</b>  | <p>Having completed this basic module students</p> <ul style="list-style-type: none"> <li>• understand new trends in inorganic chemistry;</li> <li>• recognize the relations to other chemical disciplines;</li> <li>• are able to apply modern concepts to current issues in both basic and applied research and to judge critically specialized literature.</li> </ul> <p>The students will be able to carry out more demanding synthesis in Inorganic Chemistry according to literature and also, at least in part, to develop new synthesis under instruction. They can propose, carry out and analyse reasonable investigations for characterization of new compounds on their own.</p> |
| <b>5. Prerequisites for attendance:</b>  |  |
| <b>a) recommended knowledge:</b>   | Knowledge of Inorganic Chemistry obtained during a study of chemistry or a related subject   |
| <b>b) obligatory certificates:</b>   | none   |
| to be submitted instantly <input type="checkbox"/><br>to hand in till <input type="checkbox"/> |  |
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| <b>6. Module usability:</b>                              | M.Sc. COSOM  |
| <b>7. Module start:</b>                                  | Every semester   |
| <b>8. Module duration:</b>                               | 2 semesters  |
| <b>9. Recommended semester in major:</b>                 | 1. and 2. semester in major  |
| <b>10. Total workload of the module / credit points:</b> | 420 hours / 14 credit points*<br>(165 h attendance time, 255 h home study including preparation for examination) |

\*The CP for the module will not be awarded before the final module exam or all parts of the module exam have been passed.

| <b>11. Courses:</b>   |                     |                       |   |                                       |  |
|---|---------------------|-----------------------|---|---------------------------------------|--|
|   | <i>P / WP / W *</i> | <i>Type of course</i> | <i>Subject area</i>                         | <i>Time of attendance in SWS o. h</i> | <i>Deliverables</i>  |
| 1   | P                   | V                     | Lecture Inorganic Chemistry 1               | 2                                     |  |
| 2   | P                   | V                     | Lecture Inorganic Chemistry 2               | 2                                     |  |
| 3   | P                   | V                     | Lecture Inorganic Chemistry 3               | 2                                     |  |
| 5   | P                   | P                     | Preparative Lab AC                          | 4                                     | Oral colloquia before the experiments (passed/not passed.); Synthesis of selected compounds and their characterization |
|   | P                   | S                     | Seminar accompanying the preparative lab AC | 1                                     |  |
| <b>Remarks:</b><br>Three lectures in Inorganic Chemistry have to be chosen from the pool (e.g. Inorganic Molecular Chemistry, Inorganic Material Chemistry, Bioinorganic Chemistry, etc.). The lectures that will be given can be found in the lecture timetable. |                     |                       |   |                                       |  |

\* *P = required course; WP = elective compulsory course; W = elective course*

| <b>12. Module examination:</b> |   |   |                 |  |                        |
|--------------------------------|---|---|-----------------|--|------------------------|
| <i>A/T*</i>                    | <i>Mode and content of examination</i>                          | <i>Prerequisites for admission **</i>             | <i>Duration</i> | <i>Time</i>                                  | <i>Mode of grading</i> |
| A                              | Oral module final examination covering the courses given in 11. | successful completion of the courses given in 11. | 30 min          | after completion of the 2. semester in major | graded                 |
| Remarks:                       |   |   |                 |  |                        |

\* A = module final examination; T = module partial examination; \*\* optional

| <b>13. Module grade:</b>            |   |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | The module grade is given by the grade obtained in the final module exam. |
| <input type="checkbox"/>            | The module grade is calculated as follows:                                |
| <input type="checkbox"/>            | The module will not be graded   |

| <b>14. Others:</b>   |
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| <p>If the module examination is not passed in the first repetition, a second repetition is possible. This second repetition will be generally an oral examination covering the complete module in presence of at least two examiners. In the case of a second repetition the grade of the examination will correspond to the module grade.</p> |

## COSOM-M 02

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| <b>1. Module Name:</b>   | Module Organic Chemistry  |
| <b>2. Field / Person in Charge:</b>  | Chemistry / Prof. Dr. Ruth Gschwind   |
| <b>3. Synopsis:</b>  | <p>In the lab Methods of Synthesis students will exemplary learn modern methods of organic synthesis in a research-orientated manner and practice the safe experimental handling of demanding laboratory techniques. The experiments cover enantioselective catalysis, organocatalysis, synthesis of heterocycles and drugs, methods of chromatographic separation (DC, GC, HPLC) and the characterization of intermediates and products using spectroscopy. The lab will be accompanied by a seminar (in English), where current fields in Organic Chemistry will be addressed by short presentations of the participants.</p> <p>From the given pool of lectures in Organic Chemistry the students will have to choose three. These lectures will provide deeper insight in the theoretical background of a current research topic or an area of long-time importance, e.g. catalysis, bioorganic chemistry, planning of synthesis, methods of NMR-spectroscopy, synthesis of natural compounds. For these respective fields of Organic Chemistry the basics, the state of the art and current perspectives will be discussed using examples from research.</p> |
| <b>4. Competences Acquired:</b>  | Having completed this basic module students know and understand advanced modern methods and techniques in Organic Chemistry and are able to apply them in both theory and practice. This includes the understanding of complex reaction mechanisms, the determination of the structure of more complex organic molecules by spectroscopy, the proposal and the judgement of synthetic pathways as well as the practical completion of technically demanding steps of synthesis and separation in the lab.   |
| <b>5. Prerequisites for attendance:</b>  |   |
| <b>a) recommended knowledge:</b>   | Knowledge of Organic Chemistry obtained during a study of chemistry or a related subject  |
| <b>b) obligatory certificates:</b>   |   |
| to be submitted instantly <input type="checkbox"/><br>to hand in till <input type="checkbox"/> | none  |
| <b>6. Module usability:</b>  | M.Sc. COSOM   |

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| <b>7. Module start:</b>                                  | Every semester   |
| <b>8. Module duration:</b>                               | 2 semesters  |
| <b>9. Recommended semester in major:</b>                 | 1. and 2. semester in major  |
| <b>10. Total workload of the module / credit points:</b> | 420 hours / 14 credit points*<br>(210 h attendance time, 210 h home study including preparation for examination) |

\*The CP for the module will not be awarded before the final module exam or all parts of the module exam have been passed.

| <b>11. Courses:</b>   |                     |                       |   |                                       |  |
|---|---------------------|-----------------------|---|---------------------------------------|--|
|   | <i>P / WP / W *</i> | <i>Type of course</i> | <i>Subject area</i>                                       | <i>Time of attendance in SWS o. h</i> | <i>Deliverables</i>  |
| 1   | P                   | V                     | Lecture Organic Chemistry 1                               | 2                                     |  |
| 2   | P                   | V                     | Lecture Organic Chemistry 2                               | 2                                     |  |
| 3   | P                   | V                     | Lecture Organic Chemistry 3                               | 2                                     |  |
| 5   | P                   | P                     | Methods in Organic Synthesis                              | 6                                     | Oral colloquia before the experiments (passed/not passed.) |
|   | P                   | S                     | Seminar accompanying the Lab Methods in Organic Synthesis | 2                                     | Seminar talk in English covering a given subject           |
| Remarks:<br>Three lectures in Organic Chemistry have to be chosen from the pool (OC sequence A–D). The lectures that will be given can be found in the lecture timetable. |                     |                       |   |                                       |  |

\* P = required course; WP = elective compulsory course; W = elective course

| <b>12. Module examination:</b> |   |   |                 |  |                        |
|--------------------------------|---|---|-----------------|--|------------------------|
| <i>A/T*</i>                    | <i>Mode and content of examination</i>                          | <i>Prerequisites for admission **</i>             | <i>Duration</i> | <i>Time</i>                                  | <i>Mode of grading</i> |
| A                              | Oral module final examination covering the courses given in 11. | successful completion of the courses given in 11. | 30 min          | after completion of the 2. semester in major | graded                 |
| Remarks:                       |   |   |                 |  |                        |

\* A = module final examination; T = module partial examination ; \*\* optional

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| <b>13. Module grade:</b> |
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|                                     |   |
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| <input checked="" type="checkbox"/> | The module grade is given by the grade obtained in the final module exam. |
| <input type="checkbox"/>            | The module grade is calculated as follows:                                |
| <input type="checkbox"/>            | The module will not be graded   |

**14. Others:**

If the module examination is not passed in the first repetition, a second repetition is possible. This second repetition will be generally an oral examination covering the complete module in presence of at least two examiners. In the case of a second repetition the grade of the examination will correspond to the module grade.

## COSOM-M 03

|                                     |   |
|-------------------------------------|---|
| 1. <b>Module name:</b>              | Basic Module Bioanalytics & Biosensorics  |
| 2. <b>Field / Person in Charge:</b> | Chemistry / Prof. Dr. Frank-Michael Matysik   |
| 3. <b>Synopsis:</b>                 | <p><b>Lecture Bioanalytics I:</b></p> <ul style="list-style-type: none"> <li>• Repetition: Structural and functional properties of important biomolecules</li> <li>• Optical analytics in the bulk phase: concentration and structural analysis using UV/VIS, CD, ORD, IR, fluorescence techniques</li> <li>• Separation techniques: gas- and liquid chromatography, electrophoresis, capillary electrophoresis, coupling techniques</li> <li>• Methods in mass spectrometry: categorization of MS-methods according to ionization and principle of mass separation, electrospray ionization-MS (ESI) matrix-assisted laser desorption ionization MS (MALDI), secondary ion mass spectrometry (SIMS)</li> <li>• Radioanalytical methods</li> </ul> <p><b>Lecture Bioanalytics II:</b></p> <ul style="list-style-type: none"> <li>• Imaging bioanalytics / microscopy           <ul style="list-style-type: none"> <li>- Light microscopy: transmitted-light microscopy, fluorescence microscopy, modern 3D-fluorescence microscopy</li> <li>- Electron microscopy: scanning electron microscopy, transmission electron microscopy</li> <li>- Near-field microscopy: scanning tunnel microscopy (STM), scanning force microscopy (SFM), further scanning techniques</li> </ul> </li> <li>• Special bioanalytics of selected substance classes:           <ul style="list-style-type: none"> <li>- Proteins and Peptides /</li> <li>- Carbohydrates /</li> <li>- Lipids / Nucleic acids</li> </ul> </li> <li>• Currents developments in bioanalytics</li> </ul> <p><b>Lab Bioanalytics:</b></p> <ul style="list-style-type: none"> <li>• Isolation, quantification and microscopic localization of a cytoplasmatic protein</li> <li>• Genetic fingerprinting</li> </ul> |



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|  | <ul style="list-style-type: none"> <li>• Biosensoric determination of glucose</li> <li>• Quantitative determination of binding constants by SPR</li> <li>• Capillary electrophoretic separations</li> <li>• Miniaturized solid phase extraction of neurotransmitters and their chromatographic determination</li> <li>• Conformational analysis using circular dichroism</li> <li>• Derivative spectroscopy in quantification of vitamine mixtures</li> <li>• Quantitative isotop determination in biological liquids</li> </ul>   |
| <b>4. Aims of qualification:</b>   | <p>Having completed this basic module students are able to</p> <ul style="list-style-type: none"> <li>• chose suitable analytical techniques for important biomolecules regarding to structure, concentration and matrix</li> <li>• judge the applicability, strength and limitation of bioanalytical methods</li> <li>• extract, accumulate and quantify biomolecules to be analyzed from a biological matrix</li> <li>• name and judge methods for the quantification of biomolecular recognition</li> <li>• understand and analyze biosensoric concepts for the determination of biomolecules</li> <li>• understand imaging techniques in molecular bioanalytics and judge them according to their respective field of application</li> </ul> |
| <b>5. Prerequisites for attendance:</b>  |  |
| <b>a) recommended knowledge:</b>   | <p>Basic knowledge of Analytical Chemistry obtained during a study of chemistry or a related subject;<br/>         Basic knowledge in Biochemistry</p>   |
| <b>b) obligatory certificates:</b><br><br>to be submitted instantly <input type="checkbox"/><br>to hand in till <input type="checkbox"/> | <p>none</p>  |
| <b>6. Module usability:</b>  | Chemistry M.Sc.  |
| <b>7. Module start:</b>  | Every winter semester  |
| <b>8. Module duration:</b>   | 2 semesters  |

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| <b>9. Recommended semester in major:</b>                           | 1. and 2. semester in major   |
| <b>10. Total workload of the module</b><br><b>/ credit points:</b> | 420 hours/ 14 credit points*<br>(165 h attendance time, 255 h home study including preparation for examination) |

\*The CP for the module will not be awarded before the final module exam or all parts of the module exam have been passed.

| <b>11. Courses:</b> |                     |                       |                         |                                       |  |
|---------------------|---------------------|-----------------------|-------------------------|---------------------------------------|--|
|                     | <i>P / WP / W *</i> | <i>Type of course</i> | <i>Subject area</i>     | <i>Time of attendance in SWS o. h</i> | <i>Deliverables</i>                                  |
| 1                   | P                   | V                     | Lecture Bioanalytics I  | 3                                     |  |
| 2                   | P                   | V                     | Lecture Bioanalytics II | 2                                     |  |
| 3                   | P                   | P                     | Lab Course Bioanalytics | 6                                     | Colloquia to the respective experiments; lab reports |
| Remarks:            |                     |                       |                         |                                       |  |

\* P = required course; WP = elective compulsory course; W = elective course

| <b>12. Module examination:</b> |   |   |                 |  |                        |
|--------------------------------|---|---|-----------------|--|------------------------|
| <i>A/T*</i>                    | <i>Mode and content of examination</i>                          | <i>Prerequisites for admission **</i>             | <i>Duration</i> | <i>Time</i>                                  | <i>Mode of grading</i> |
| A                              | Oral module final examination covering the courses given in 11. | successful completion of the courses given in 11. | 30 min          | after completion of the 2. semester in major | graded                 |
| Remarks:                       |   |   |                 |  |                        |

\* A = module final examination; T = module partial examination \*\* optional

| <b>13. Module grade:</b>            |   |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | The module grade is given by the grade obtained in the final module exam. |
| <input type="checkbox"/>            | The module grade is calculated as follows:                                |
| <input type="checkbox"/>            | The module will not be graded   |



**14. Others:**

If the module examination is not passed in the first repetition, a second repetition is possible. This second repetition will be generally an oral examination covering the complete module in presence of at least two examiners. In the case of a second repetition the grade of the examination will correspond to the module grade.

## 2. COMPULSORY PART:

### COSOM-M 04

|                                     |   |
|-------------------------------------|---|
| <b>1. Module name:</b>              | Module Formulation  |
| <b>2. Field / Person in Charge:</b> | Chemistry / Prof. Dr. Werner Kunz   |
| <b>3. Synopsis:</b>                 | <p>During the lecture (with exercises) students will learn the basics of preparation of final products by mixing and compatibilizing of different chemical substances (active reagents and additives). Special attention is paid to the use of surfactants as emulgators and on relevant modern concepts beyond common empiric approaches.</p> <p>In addition both ecological and economical issues in product formulation will be addressed. These concepts will be mostly applied to the preparation of emulsions, but foams and powders will be treated, too.</p> <p>During the seminar students will present relevant topics in formulation or the underlying colloidal- and surface chemistry by appropriate demonstration experiments in English language.</p> <p>During the lab course students become familiar with both the practical preparation of different final products and the physico-chemical basics for their preparation and assessment. This will, for example, include the construction of phase diagrams and their characterization by simple laboratory methods (microscopy, electrical conductance, viscosity, evaluation of stability).</p> |
| <b>4. Aims of qualification:</b>    | Students know and understand the basics of formulation of marketable products, especially of those based on surfactants (e.g. emulsions) in household and cosmetics and are able to formulate such products on their own, with special regard to ecological and economical issues.  |

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| <b>5. Prerequisites for attendance:</b>  |   |
| <b>a) recommended knowledge:</b>   | Knowledge of Physical Chemistry obtained during a study of chemistry or a related subject                       |
| <b>b) obligatory certificates:</b><br>to be submitted instantly <input type="checkbox"/><br>to hand in till <input type="checkbox"/> | none  |
| <b>6. Module usability:</b>  | M.Sc. COSOM   |
| <b>7. Module start:</b>  | every semester  |
| <b>8. Module duration:</b>   | 2 semesters   |
| <b>9. Recommended semester in major:</b>   | 1. and 2. semester in major   |
| <b>10. Total workload of the module / credit points:</b>   | 360 hours/ 12 credit points*<br>(165 h attendance time, 195 h home study including preparation for examination) |

\*The CP for the module will not be awarded before the final module exam or all parts of the module exam have been passed.

| <b>11. Courses:</b> |                     |                       |  |                                       |   |
|---------------------|---------------------|-----------------------|--|---------------------------------------|---|
|                     | <i>P / WP / W *</i> | <i>Type of course</i> | <i>Subject area</i>                      | <i>Time of attendance in SWS o. h</i> | <i>Deliverables</i>                                   |
| 1                   | P                   | V                     | Lecture Formulation                      | 4                                     |   |
| 2                   | P                   | P                     | Lab Course Formulation                   | 5                                     | Testified lab reports                                 |
| 3                   | P                   | S                     | Seminar accompanying the Lab Formulation | 2                                     | Experimental seminar talk in English; duration 60 min |
| Remarks:            |                     |                       |  |                                       |   |

\* P = required course; WP = elective compulsory course; W = elective course

**12. Module examination:**

| <i>A/T*</i> | <i>Mode and content of examination</i>                          | <i>Prerequisites for admission **</i>             | <i>Duration</i> | <i>Time</i>                                  | <i>Mode of grading</i> |
|-------------|---|---|-----------------|--|------------------------|
| A           | Oral module final examination covering the courses given in 11. | successful completion of the courses given in 11. | 30 min          | after completion of the 2. semester in major | graded                 |

remarks:

\* A = module final examination; T = module partial examination \*\* optional

**13. Module grade:**

|                                     |   |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | The module grade is given by the grade obtained in the final module exam. |
| <input type="checkbox"/>            | The module grade is calculated as follows:                                |
| <input type="checkbox"/>            | The module will not be graded   |

**14. Others:**

If the module examination is not passed in the first repetition, a second repetition is possible. This second repetition will be generally an oral examination covering the complete module in presence of at least two examiners. In the case of a second repetition the grade of the examination will correspond to the module grade.

## COSOM-M 05

|                                     |  |
|-------------------------------------|--|
| <b>1. Module name:</b>              | Module Condensed Matter  |
| <b>2. Field / Person in Charge:</b> | Chemistry / Prof. Dr. Werner Kunz  |
| <b>3. Synopsis:</b>                 | <p>During the lab course „Advanced Physical Chemistry“ the participants become familiar with exemplary modern techniques for the characterization of the fluid state and its interfaces in a research orientated way. Experiments have to be chosen in the fields of spectroscopy, thermodynamics, electrochemistry and analytics of interfaces.</p> <p>In addition three lectures with exercises have to be taken. In the first lecture modern methods for the investigation of the liquid state will be discussed including the microscopic and macroscopic properties of the fluid phase which can be derived. Besides spectroscopic and thermodynamic methods an introduction to scattering techniques (x-ray-, neutron- and light scattering) will be given.</p> <p>The second lecture covers the characterization of surfaces and interfaces while the third lectures gives an introduction to modern methods of computer simulation of the fluid state.</p> <p>Besides the basics of the respective areas the state of the art and current perspectives will be shown using examples from research.</p> |
| <b>4. Aims of qualification:</b>    | <p>Students know and understand advanced modern methods and techniques for the characterization of simple and complex fluids and their interfaces and are able to apply these in both theory and practice. This includes the understanding of the basics of modern scattering techniques and methods of computer simulation and the suggestion and assessment of appropriate experiments as well as conducting them in the lab.</p>  |

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| <b>5. Prerequisites for attendance:</b>  |   |
| <b>a) recommended knowledge:</b>   | Knowledge of Physical Chemistry obtained during a study of chemistry or a related subject                       |
| <b>b) obligatory certificates:</b><br>to be submitted instantly <input type="checkbox"/><br>to hand in till <input type="checkbox"/> | none  |
| <b>6. Module usability:</b>  | M.Sc. COSOM   |
| <b>7. Module start:</b>  | every semester  |
| <b>8. Module duration:</b>   | 2 semesters   |
| <b>9. Recommended semester in major:</b>   | 1. and 2. semester in major   |
| <b>10. Total workload of the module / credit points:</b>   | 480 hours/ 16 credit points*<br>(180 h attendance time, 300 h home study including preparation for examination) |

\*The CP for the module will not be awarded before the final module exam or all parts of the module exam have been passed.

| <b>11. Courses:</b> |                     |                       |                               |                                       |  |
|---------------------|---------------------|-----------------------|-------------------------------|---------------------------------------|--|
|                     | <i>P / WP / W *</i> | <i>Type of course</i> | <i>Subject area</i>           | <i>Time of attendance in SWS o. h</i> | <i>Deliverables</i>  |
| 1                   | P                   | V                     | Lecture Condensed Matter I    | 2                                     |  |
| 2                   | P                   | V                     | Lecture Condensed Matter II   | 3                                     |  |
| 3                   | P                   | V                     | Lecture Condensed Matter III  | 3                                     |  |
| 4                   | P                   | P                     | Lab Course Physical Chemistry | 4                                     | Oral colloquia before the experiments; testified lab reports |
| Remarks:            |                     |                       |                               |                                       |  |

\* P = required course; WP = elective compulsory course; W = elective course



**12. Module examination:**

| <i>A/T*</i> | <i>Mode and content of examination</i>                             | <i>Prerequisites for admission **</i>             | <i>Duration</i> | <i>Time</i>                                  | <i>Mode of grading</i> |
|-------------|--|---|-----------------|--|------------------------|
| A           | Written module final examination covering the courses given in 11. | successful completion of the courses given in 11. | 180 min         | after completion of the 2. semester in major | graded                 |

remarks:

*\* A = module final examination; T = module partial examination \*\* optional*

**13. Module grade:**

|                                     |   |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | The module grade is given by the grade obtained in the final module exam. |
| <input type="checkbox"/>            | The module grade is calculated as follows:                                |
| <input type="checkbox"/>            | The module will not be graded   |

**14. Others:**

If the module examination is not passed in the first repetition, a second repetition is possible. This second repetition will be generally an oral examination covering the complete module in presence of at least two examiners. In the case of a second repetition the grade of the examination will correspond to the module grade.

## COSOM-M 06

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| <b>1. Module name:</b>   | Moduls Colloidal Chemistry   |
| <b>2. Field / Person in Charge:</b>  | Chemistry / Prof. Dr. Werner Kunz  |
| <b>3. Synopsis:</b>  | <p>Two lectures with exercises will cover the basics of Colloidal- and Interface Chemistry in detail and by use of examples from research and application. Besides the common phenomena specific for interfaces their thermodynamics will be addressed, with special regard to association colloids and the properties of polymers in solution. In addition, lectures will provide an introduction to rheology and the field of suspensions and aerosols.</p> <p>The third lecture can be chosen from a pool of courses treating special topics in colloidal and interface chemistry, like the fields of polymers, spectroscopy of interfaces, biophysical chemistry or computer simulation.</p> |
| <b>4. Aims of qualification:</b>   | Students know and understand the special properties of colloids and interfaces and are able to apply the given concepts to problems relevant in research and application. In addition they are able to read and critically judge the respective scientific literature.   |
| <b>5. Prerequisites for attendance:</b>  |  |
| <b>a) recommended knowledge:</b>   | Knowledge of Physical Chemistry obtained during a study of chemistry or a related subject  |
| <b>b) obligatory certificates:</b>   |  |
| to be submitted instantly <input type="checkbox"/><br>to hand in till <input type="checkbox"/> | none   |
| <b>6. Module usability:</b>  | M.Sc. COSOM  |
| <b>7. Module start:</b>  | every semester   |
| <b>8. Module duration:</b>   | 2 semesters  |
| <b>9. Recommended semester in major:</b>   | 1. and 2. semester in major  |
| <b>10. Total workload of the module / credit points:</b>                                       | 450 hours/ 15 credit points*<br>(180 h attendance time, 270 h home study including preparation for examination)  |

*\*The CP for the module will not be awarded before the final module exam or all parts of the module exam have been passed.*

**11. Courses:**

|   | <i>P /<br/>WP /<br/>W *</i> | <i>Type of<br/>course</i> | <i>Subject area</i>  | <i>Time of<br/>attendance in<br/>SWS o. h</i> | <i>Deliverables</i> |
|---|-----------------------------|---------------------------|----------------------|---|---------------------|
| 1 | P                           | V                         | Lecture Colloids I   | 4   |                     |
| 2 | P                           | V                         | Lecture Colloids II  | 4   |                     |
| 3 | P                           | V                         | Lecture Colloids III | 4   |                     |

**Remarks:**

From the pool of courses in the field of colloids for the lecture Colloids III one 4h- or two 2h-lectures have to be chosen (e.g. Interface Chemistry, Biophysical Chemistry, Simulation of Interfaces, Polymers, Electrochemistry etc.). The lectures that will be given can be found in the lecture timetable.

\* *P = required course; WP = elective compulsory course; W = elective course*

**12. Module examination:**

| <i>A/T*</i> | <i>Mode and content of<br/>examination</i>                         | <i>Prerequisites for<br/>admission **</i>         | <i>Duration</i> | <i>Time</i>                                  | <i>Mode of<br/>grading</i> |
|-------------|--|---|-----------------|--|----------------------------|
| A           | Written module final examination covering the courses given in 11. | successful completion of the courses given in 11. | 180 min         | after completion of the 2. semester in major | graded                     |

**remarks:**

\* *A = module final examination; T = module partial examination \*\* optional*

**13. Module grade:**

|                                     |   |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | The module grade is given by the grade obtained in the final module exam. |
| <input type="checkbox"/>            | The module grade is calculated as follows:                                |
| <input type="checkbox"/>            | The module will not be graded   |

**14. Others:**

If the module examination is not passed in the first repetition, a second repetition is possible. This second repetition will be generally an oral examination covering the complete module in presence of at least two examiners. In the case of a second repetition the grade of the examination will correspond to the module grade.

## COSOM-M 07

|  |   |
|--|---|
| <b>1. Module name:</b>   | Preparatory Module for the Master thesis  |
| <b>2. Field / Person in Charge:</b>  | Chemistry / Prof. Dr. Werner Kunz   |
| <b>3. Synopsis:</b>  | <p>The module covers a method course in the respective field of the master thesis and two language courses. The method course includes a deeper instruction in selected scientific methods in the respective field of the master thesis and their exemplary testing in practice.</p> <p>The language courses will provide the student with either basics or deeper knowledge (according to his grading) in the respective language of the country the master thesis will be completed in.</p> |
| <b>4. Aims of qualification:</b>   | Students are able to apply scientific methods in the respective field of the master thesis in a both theoretically and practically reflected way. In addition, their language skills are sufficient to communicate in everyday life in the language of the respective host country.   |
| <b>5. Prerequisites for attendance:</b>  |   |
| <b>a) recommended knowledge:</b>   | <p>Knowledge of Chemistry obtained during a study of chemistry or a related subject</p> <p>Knowledge in the field of the modules taken during the master study (from COSOM-M 01 – COSOM-M 06)</p>   |
| <b>b) obligatory certificates:</b>   |   |
| to be submitted instantly <input type="checkbox"/><br>to hand in till <input type="checkbox"/> | none  |
| <b>6. Module usability:</b>  | M.Sc. COSOM   |
| <b>7. Module start:</b>  | every semester  |
| <b>8. Module duration:</b>   | 2 semesters   |
| <b>9. Recommended semester in major:</b>   | 3. and 4. semester in major   |
| <b>10. Total workload of the module / credit points:</b>                                       | 480 hours/ 16 credit points*<br>(240 h attendance time, 240 h home study)   |

*\*The CP for the module will not be awarded before the final module exam or all parts of the module exam have been passed.*

| <b>11. Courses:</b> |                             |                           |   |  |                           |
|---------------------|-----------------------------|---------------------------|---|--|---------------------------|
|                     | <i>P /<br/>WP /<br/>W *</i> | <i>Type of<br/>course</i> | <i>Subject area</i>                         | <i>Tme of<br/>attendance in<br/>SWS o. h</i> | <i>Deliverables</i>       |
| 1                   | P                           |                           | Method Course                               | 10   | Certificate of Attendance |
| 2                   | P                           |                           | Language and culture of the host country I  | 3  | Certificate of Attendance |
| 3                   | P                           |                           | Language and culture of the host country II | 3  | Certificate of Attendance |
| Remarks:            |                             |                           |   |  |                           |

\* *P = required course; WP = elective compulsory course; W = elective course*

| <b>12. Module grade:</b>            |   |
|-------------------------------------|---|
| <input type="checkbox"/>            | The module grade is given by the grade obtained in the final module exam. |
| <input type="checkbox"/>            | The module grade is calculated as follows:                                |
| <input checked="" type="checkbox"/> | The module will not be graded   |

| <b>13. Others:</b> |
|--------------------|
|                    |

## COSOM-M 08

|  |  |
|--|--|
| <b>1. Module name:</b>   | Master thesis  |
| <b>2. Field / Person in Charge:</b>  | Chemistry / Prof. Dr. Werner Kunz  |
| <b>3. Synopsis:</b>  | <p>The module includes the work on the master thesis and the regular attendance of the work group seminar offered by the supervisor of the thesis. In the master thesis a current topic in the chemistry of interfaces, colloids or formulation will be investigated by the student under supervision, but mostly on its own.</p> <p>Both topic and methods will be agreed on with the supervisor. In the work group seminar current topics in ongoing research will be presented and discussed. The student will report on the results of his thesis at least once. The module will practice the writing of a scientific contribution and guide to autonomous research.</p> |
| <b>4. Aims of qualification:</b>   | <p>The students will be able to plan and conduct work on a scientific problem in chemistry or a related natural science on his own. He has advanced skills in literature search and -analysis, design of experiments and their analysis as well as in scientific writing.</p> <p>Due to his stay abroad he has gathered international experience in research and education.</p>  |
| <b>5. Prerequisites for attendance:</b>  |  |
| <b>a) recommended knowledge:</b>   | <p>Knowledge of Chemistry obtained during a study of chemistry or a related subject</p> <p>Knowledge in the field of the modules taken during the master study (from COSOM-M 01 – COSOM-M 06)</p>  |
| <p><b>b) obligatory certificates</b></p> <p>to be submitted instantly <input type="checkbox"/></p> <p>to hand in till end of 3rd semester in major <input checked="" type="checkbox"/></p> | <p>At least two completed modules (out of COSOM-M 01 – COSOM-M 07)</p>   |
| <b>6. Module usability:</b>  | M.Sc. COSOM  |
| <b>7. Module start:</b>  | every semester   |
| <b>8. Module duration:</b>   | 2 semesters  |
| <b>9. Recommended semester in major:</b>   | 3. and 4. semester in major  |

|  |  |
|--|--|
| <b>10. Total workload of the module</b><br><b>/ credit points:</b> | 990 hours/ 33 credit points*<br>480 h attendance time, 510 h home study) |
|--|--|

\*The CP for the module will not be awarded before the final module exam or all parts of the module exam have been passed.

| <b>11. Courses:</b> |                     |                       |                     |                                       |  |
|---------------------|---------------------|-----------------------|---------------------|---------------------------------------|--|
|                     | <i>P / WP / W *</i> | <i>Type of course</i> | <i>Subject area</i> | <i>Time of attendance in SWS o. h</i> | <i>Deliverables</i>                                  |
| 1                   | P                   |                       | Master thesis       |                                       | Master thesis (graded)                               |
| 2                   | P                   | S                     | Work group seminar  | 4                                     | Reports on current research during the master thesis |
| Remarks:            |                     |                       |                     |                                       |  |

\* P = required course; WP = elective compulsory course; W = elective course

| <b>12. Module examination:</b> |  |   |                 |  |                        |
|--------------------------------|--|---|-----------------|--|------------------------|
| <i>A/T*</i>                    | <i>Mode and content of examination</i> | <i>Prerequisites for admission **</i>             | <i>Duration</i> | <i>Time</i>                                  | <i>Mode of grading</i> |
| A                              | Presentation with discussion           | successful completion of the courses given in 11. | 20 min          | after completion of the 4. semester in major | passed/not passed      |
| Remarks:                       |  |   |                 |  |                        |

\* A = module final examination; T = module partial examination \*\* optional

| <b>13. Module grade:</b>            |   |       |
|-------------------------------------|---|-------|
| <input type="checkbox"/>            | The module grade is given by the grade obtained in the final module exam. |       |
| <input checked="" type="checkbox"/> | The module grade is calculated as follows:                                |       |
|                                     | Master thesis   | 100 % |
| <input type="checkbox"/>            | The module will not be graded   |       |

| <b>14. Others:</b>   |
|--|
| The module is passed, if the module examination is graded passed and die grade for the master thesis is at least „sufficient“. |