**Specialisering på kandidatuddannelsen i Nanoscience**

På kandidatuddannelsen i Nanoscience skal der indgå en faglig specialisering på 40 ECTS.

Der kan vælges mellem følgende 4 specialiseringer:

**Nanomaterials**

**Biomedical Nanotechnology**

**Structural Biology and Biophysics**

**Organic Nanochemistry/Soft Matter**

Hver specialisering udgøres af et eller flere oligatoriske kurser for den specifikke specialisering samt et antal kurser, der skal vælges ud fra en mindre liste af kurser for den givne specialisering.

Alle specialiseringer inkluderer kurset *Trends in Nanoscience – Communication and Entrepreneurship*.

Studerende, der tager på udvekslingsophold i et eller to semestre, er ikke omfattet af det formelle krav til specialisering.

Specialiseringen efterlader 20 ECTS til valgfrie kurser på kandidatuddannelsen. Her kan følges (i) yderligere kurser fra specialiseringen, (ii) kurser fra en liste over foreslåede valgfag i relation til specialiseringen, eller (iii) øvrige hensigtsmæssige kurser. Det er muligt at lave et individuelt projekt på 5 eller 10 ECTS eller et erhvervsprojekt – dvs. et 10 ECTS projekt i samarbejde med en virksomhed. Disse projekter vil i givet fald indgå som et valgfrit kursus.

Kandidatuddannelsen i Nanoscience giver i udgangpunktet ikke undervisningskompetence i gymnasieskolen. Der er dog en del alumner, der alligevel er gået den vej, typisk efter faglig supplering. Hvis man gerne vil lette denne proces, kan der være hensigtmæssige valgfrie kurser, som ikke er nævnt i dette dokument. Hvis man har interesse i denne retning anbefales man at tage det op med den uddannelsesansvarlige i forbindelse med valg af kurser.

Det samlede kursusvalg på kandidatuddannelsen skal indføres i en studiekontrakt og godkendes af den uddannelsesansvarlige.

I tilknytning til hver af de fire specialiseringer er der en anbefaling vedr. valgfag på bacheloruddannelsen som vil være hensigtsmæssige at følge før specialiseringen. Anbefalingerne omfatter typisk mere end de 20 ECTS valgfag på bacheloruddannelsen, og man må således vælge blandt de anbefalede kurser afhængig af interesse. Nogle kurser på specialiseringen kan kræve, at bestemte valgfag er fulgt på bacheloruddannelsen.

På de følgende sider er der anført tabeller med kursusinformation for de fire specialiseringsretninger samt de anbefalede bachelorvalgfag. De detaljerede kursusbeskrivelser kan findes i kursuskataloget <http://kursuskatalog.au.dk>, der er direkte link til kursusbeskrivelsen fra kursets navn i tabellen. Hvis man gerne selv vil søge i kursuskataloget kan man med fordel filtrere efter udbyder (institut) og semester. For 5 ECTS kurser gælder at de løber over 14 uger, medmindre kvarter (Q) er angivet.

Der tages forbehold for at listen er udarbejdet inden kursuskataloget var endeligt færdiggjort. Ved uoverensstemmelser er det kursuskatalogets information der gælder.



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| **Recommended optional courses at the Bachelor’s degree programme for the four specializations** |
|  |  |  |  |
| **Course title** | **ECTS** | **Semester** | **Provider** |
|  |  |  |  |
| **Nanomaterials** |  |  |  |
|  |  |  |  |
| [Materials Chemistry I](https://kursuskatalog.au.dk/en/course/114919/Materials-Chemistry-I)  | 10 | Fall | Chem |
| [Electrodynamics](https://kursuskatalog.au.dk/en/course/111601/Electrodynamics)  | 10 | Spring | Phys |
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| **Biomedical Nanotechnology** |  |  |  |
|  |  |  |  |
| [Metabolism - Concepts and Design](https://kursuskatalog.au.dk/en/course/111500/Metabolism-Concepts-and-Design)  | 10 | Spring | MolBio |
| [Materials Chemistry I](https://kursuskatalog.au.dk/en/course/114919/Materials-Chemistry-I) | 10 | Fall | Chem |
| [Molecular Processes in the Cell](https://kursuskatalog.au.dk/en/course/107623/Molecular-Processes-in-the-Cell)  | 10 | Fall | MolBio |
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| **Structural Biology and Biophysics** |  |  |  |
|  |  |  |  |
| Molecular Biophysical [Chemistry](https://kursuskatalog.au.dk/en/course/114335/Molecular-Biophysical-Chemistry) | 10 | Fall | Chem |
| [Structural Chemistry IIa: Spectroscopy in Organic Chemistry](https://kursuskatalog.au.dk/en/course/111445/Structural-Chemistry-IIa-Spectroscopy-in-Organic-Chemistry)  | 5 | Spring | Chem |
| [Structural Chemistry IIb: Biophysical Chemistry](https://kursuskatalog.au.dk/en/course/111451/Structural-Chemistry-IIb-Biophysical-Chemistry)  | 5 | Spring | Chem |
| [Structural Chemistry IIc: Chemical Crystallography](https://kursuskatalog.au.dk/en/course/111449/Structural-Chemistry-IIc-Chemical-Crystallography)  | 5 | Spring | Chem |
| [Proteins and their Interactions](https://kursuskatalog.au.dk/en/course/111496/Proteins-and-their-Interactions)  | 10 | Spring | MolBio |
| [Modelling IIa: Drug Design and Bioinformatics](https://kursuskatalog.au.dk/en/course/111530/Modelling-IIa-Drug-Design-and-Bioinformatics)  | 10 | Spring | Chem |
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| **Organic Nanochemistry/Soft Matter** |  |  |  |
|  |  |  |  |
| [Structural Chemistry I](https://kursuskatalog.au.dk/en/course/114336/Structural-Chemistry-I) | 5 | Fall | Chem |
| [Analytical Chemistry](https://kursuskatalog.au.dk/en/course/114230/Analytical-Chemistry) | 5 | Fall | Chem |
| [Organic Chemistry II: Reaction Mechanisms](https://kursuskatalog.au.dk/en/course/111441/Organic-Chemistry-II-Reaction-Mechanisms)  | 10 | Spring | Chem |
| [Structural Chemistry IIa: Spectroscopy in Organic Chemistry](https://kursuskatalog.au.dk/en/course/111445/Structural-Chemistry-IIa-Spectroscopy-in-Organic-Chemistry)  | 5 | Spring | Chem |
| [Structural Chemistry IIb: Biophysical Chemistry](https://kursuskatalog.au.dk/en/course/111451/Structural-Chemistry-IIb-Biophysical-Chemistry)  | 5 | Spring | Chem |
| [Polymer Chemistry](https://kursuskatalog.au.dk/en/course/111706/Polymer-Chemistry)  | 10 | Spring | Eng |

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| **Nanomaterials** |  |  |  |
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| **Course title** | **ECTS** | **Semester** | **Provider** |
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| **Recommended optional courses at the Bachelor’s degree programme** |  |  |  |
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| [Materials Chemistry I](https://kursuskatalog.au.dk/en/course/114919/Materials-Chemistry-I)  | 10 | Fall | Chem |
| [Electrodynamics](https://kursuskatalog.au.dk/en/course/111601/Electrodynamics)  | 10 | Spring | Phys |
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| **Specializing at the Master’s degree programme** |  |  |  |
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| **The following must be included in the specialization** |  |  |  |
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| [Trends in Nanoscience - Communication and Entrepreneurship](https://kursuskatalog.au.dk/en/course/111578/Trends-in-Nanoscience-Communication-and-Entrepreneurship)  | 10 | Spring | iNANO |
| [Surface and Semiconductor-Physics](https://kursuskatalog.au.dk/en/course/114804/Surface-and-Semiconductor-Physics)  | 10 | Fall | Phys |
| [Materials Chemistry IIId: Synchrotron and Neutron Science](https://kursuskatalog.au.dk/en/course/111573/Materials-Chemistry-IIId-Synchrotron-and-Neutron-Science)  | 10 | Spring | Chem |
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| **In combination with at least 10 ECTS from the list below** |  |  |  |
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| [Cleanroom-based Micro and Nano Fabrication](https://kursuskatalog.au.dk/en/course/114221/Cleanroom-based-Micro-and-Nano-Fabrication)  | 5 | Fall Q1 | iNANO |
| [Biomaterials](https://kursuskatalog.au.dk/en/course/114423/Biomaterials)  | 5 | Fall Q2 | iNANO |
| [Materials Chemistry IIIa: Physical Solid State Chemistry](https://kursuskatalog.au.dk/en/course/115200/Materials-Chemistry-IIIa-Physical-Solid-State-Chemistry)  | 10 | Fall | Chem |
| [Solid State Physics II](https://kursuskatalog.au.dk/en/course/111833/Solid-State-Physics-II)  | 10 | Spring | Phys |
| [Advanced Statistical Physics](https://kursuskatalog.au.dk/en/course/114673/Advanced-Statistical-Physics)  | 5 | Fall | Phys |
| [Materials Chemistry IIIb: Advanced Crystallography](https://kursuskatalog.au.dk/en/course/114306/Materials-Chemistry-IIIb-Advanced-Crystallography)  | 10 | Fall | Chem |
| [Materials Chemistry IIIc: Solid State NMR](https://kursuskatalog.au.dk/en/course/114295/Materials-Chemistry-IIIc-Solid-State-NMR)  | 10 | Fall | Chem |
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| **Recommended optional courses in relation to this specialization** |  |  |  |
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| [Lasers & Optics](https://kursuskatalog.au.dk/en/course/111593/Lasers-Optics)  | 10 | Spring | Phys |
| [Electronics and Data Acquisition](https://kursuskatalog.au.dk/en/course/114327/Electronics-and-Data-Acquisition)  | 10 | Fall | Phys |
| [Organic Chemistry IIIc: Electrochemistry and Organic Surface Chemistry](https://kursuskatalog.au.dk/en/course/114304/Organic-Chemistry-IIIc-Electrochemistry-and-Organic-Surface-Chemistry)  | 10 | Fall | Chem |
| [Polymer Chemistry](https://kursuskatalog.au.dk/en/course/111706/Polymer-Chemistry) | 10 | Spring | Eng |
| [Advanced Polymers and Nanomaterials](https://kursuskatalog.au.dk/en/course/114803/Advanced-Polymers-and-Nanomaterials)  | 10 | Fall | Eng |
| [Physical Chemistry IIIb: Soft Matter and Scattering Methods](https://kursuskatalog.au.dk/en/course/114324/Physical-Chemistry-IIIb-Soft-Matter-and-Scattering-Methods)  | 10 | Fall | Chem |
| [Structural Chemistry IIc: Chemical Crystallography](https://kursuskatalog.au.dk/en/course/111449/Structural-Chemistry-IIc-Chemical-Crystallography) | 5 | Spring | Chem |
| [Materials Chemistry II: Experimental Materials Chemistry](https://kursuskatalog.au.dk/en/course/114233/Materials-Chemistry-II-Experimental-Materials-Chemistry)  | 10 | Fall | Chem |
| [Introduction to Programming with Scientific Applications](https://kursuskatalog.au.dk/en/course/111388/Introduction-to-Programming-with-Scientific-Applications) | 10 | Spring | CS |
| [Atmospheric Chemistry](https://kursuskatalog.au.dk/en/course/111556/Atmospheric-Chemistry) | 10 | Spring | Chem |
| [Application of Synchrotron Radiation in Nanoscience](https://kursuskatalog.au.dk/en/course/111672/Application-of-Synchrotron-Radiation-in-Nanoscience) | 5 | Summer | iNANO |
| [Individual Project in Nanoscience (5 or 10 ECTS)](https://kursuskatalog.au.dk/en/course/114225/Individual-Project-in-Nanoscience-10-ECTS) | 5-10 | Fall/Spring | iNANO |
| [Business Project in Nanoscience](https://kursuskatalog.au.dk/en/course/114227/Business-Project-in-Nanoscience) | 10 | Fall/Spring | iNANO |

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| **Biomedical Nanotechnology** |  |  |  |
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| **Course title** | **ECTS** | **Semester** | **Provider** |
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| **Recommended optional courses at the Bachelor’s degree programme**  |  |  |  |
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| [Metabolism - Concepts and Design](https://kursuskatalog.au.dk/en/course/111500/Metabolism-Concepts-and-Design)  | 10 | Spring | MolBio |
| [Materials Chemistry I](https://kursuskatalog.au.dk/en/course/114919/Materials-Chemistry-I) | 10 | Fall | Chem |
| [Molecular Processes in the Cell](https://kursuskatalog.au.dk/en/course/114293/Molecular-Processes-in-the-Cell)  | 10 | Fall | MolBio |
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| **Specializing at the Master’s degree programme** |  |  |  |
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| **The following must be included in the specialization** |  |  |  |
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| [Trends in Nanoscience - Communication and Entrepreneurship](https://kursuskatalog.au.dk/en/course/111578/Trends-in-Nanoscience-Communication-and-Entrepreneurship)  | 10 | Spring | iNANO |
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| **In combination with at least 10 ECTS from the list below** |  |  |  |
|  |  |  |  |
| [Nanomedicine](https://kursuskatalog.au.dk/en/course/114223/Nanomedicine)  | 5 | Fall Q1 | iNANO |
| [Cleanroom-based Micro and Nano Fabrication](https://kursuskatalog.au.dk/en/course/114221/Cleanroom-based-Micro-and-Nano-Fabrication)  | 5 | Fall Q1 | iNANO |
| [Biomaterials](https://kursuskatalog.au.dk/en/course/114423/Biomaterials)  | 5 | Fall Q2 | iNANO |
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| **And minimum 20 ECTS from the list below** |  |  |  |
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| [Molecular Processes in the Cell](https://kursuskatalog.au.dk/en/course/114293/Molecular-Processes-in-the-Cell)  | 10 | Fall | MolBio |
| [Cell Biology in Health, Ageing and Disease](https://kursuskatalog.au.dk/en/course/111522/Cell-Biology-in-Health-Ageing-and-Disease) | 10 | Spring | MolBio |
| [Bionanotechnology and synthetic biology](https://kursuskatalog.au.dk/en/course/115208/Bionanotechnology-and-synthetic-biology)  | 10 | Fall | iNANO |
| [Molecular Microbiology](https://kursuskatalog.au.dk/en/course/112240/Molecular-Microbiology)  | 10 | Spring | Bioscience |
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| **Recommended optional courses in relation to this specialization** |  |  |  |
|  |  |  |  |
| [Surface and Semiconductor-Physics](https://kursuskatalog.au.dk/en/course/114804/Surface-and-Semiconductor-Physics) | 10 | Fall | Phys |
| [Physical Chemistry IIIb: Soft Matter and Scattering Methods](https://kursuskatalog.au.dk/en/course/114324/Physical-Chemistry-IIIb-Soft-Matter-and-Scattering-Methods)  | 10 | Fall | Chem |
| [Nanoscale Bioimaging and Single Molecule Biophysics](https://kursuskatalog.au.dk/en/course/111577/Nanoscale-Bioimaging-and-Single-Molecule-Biophysics) | 10 | Spring | iNANO |
| [Medicinal Chemistry I: Drug Discovery and Drug Delivery](https://kursuskatalog.au.dk/en/course/111529/Medicinal-Chemistry-I-Drug-Discovery-and-Drug-Delivery)  | 10 | Spring | Chem |
| [Medicinal Chemistry II: Chemical Biology](https://kursuskatalog.au.dk/en/course/111576/Medicinal-Chemistry-II-Chemical-Biology) | 10 | Spring | Chem |
| [Modelling IIa: Drug Design and Bioinformatics](https://kursuskatalog.au.dk/en/course/111530/Modelling-IIa-Drug-Design-and-Bioinformatics)  | 10 | Spring | Chem |
| [Polymer Chemistry](https://kursuskatalog.au.dk/en/course/111706/Polymer-Chemistry)  | 10 | Spring | Eng |
| [Human Physiology](https://kursuskatalog.au.dk/en/course/111336/Human-Physiology) | 10 | Sprinh | Biomedicine |
| [Individual Project in Nanoscience (5 or 10 ECTS)](https://kursuskatalog.au.dk/en/course/114225/Individual-Project-in-Nanoscience-10-ECTS) | 5-10 | Fall/Spring | iNANO |
| [Business Project in Nanoscience](https://kursuskatalog.au.dk/en/course/114227/Business-Project-in-Nanoscience)  | 10 | Fall/Spring | iNANO |

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| **Structural Biology and Biophysics** |  |  |  |
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| **Course title** | **ECTS** | **Semester** | **Provider** |
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| **Recommended optional courses at the Bachelor’s degree programme** |  |  |  |
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| [Molecular Biophysical Chemistry](https://kursuskatalog.au.dk/en/course/114335/Molecular-Biophysical-Chemistry) | 10 | Fall | Chem |
| [Structural Chemistry IIa: Spectroscopy in Organic Chemistry](https://kursuskatalog.au.dk/en/course/111445/Structural-Chemistry-IIa-Spectroscopy-in-Organic-Chemistry) | 5 | Spring | Chem |
| [Structural Chemistry IIb: Biophysical Chemistry](https://kursuskatalog.au.dk/en/course/111451/Structural-Chemistry-IIb-Biophysical-Chemistry)  | 5 | Spring | Chem |
| [Structural Chemistry IIc: Chemical Crystallography](https://kursuskatalog.au.dk/en/course/111449/Structural-Chemistry-IIc-Chemical-Crystallography)  | 5 | Spring | Chem |
| [Proteins and their Interactions](https://kursuskatalog.au.dk/en/course/111496/Proteins-and-their-Interactions) | 10 | Spring | MolBio |
| [Modelling IIa: Drug Design and Bioinformatics](https://kursuskatalog.au.dk/en/course/111530/Modelling-IIa-Drug-Design-and-Bioinformatics)  | 10 | Spring | Chem |
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| **Specializing at the Master’s degree programme** |  |  |  |
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| **The following must be included in the specialization** |  |  |  |
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| [Trends in Nanoscience - Communication and Entrepreneurship](https://kursuskatalog.au.dk/en/course/111578/Trends-in-Nanoscience-Communication-and-Entrepreneurship)  | 10 | Spring | iNANO |
|  |  |  |  |
| **In combination with at least 30 ECTS from the list below** |  |  |  |
|  |  |  |  |
| [Bionanotechnology and synthetic biology](https://kursuskatalog.au.dk/en/course/115208/Bionanotechnology-and-synthetic-biology)  | 10 | Fall | iNANO |
| [Nanoscale Bioimaging and Single Molecule Biophysics](https://kursuskatalog.au.dk/en/course/111577/Nanoscale-Bioimaging-and-Single-Molecule-Biophysics) | 10 | Spring | iNANO |
| [Modelling IIa: Drug Design and Bioinformatics](https://kursuskatalog.au.dk/en/course/111530/Modelling-IIa-Drug-Design-and-Bioinformatics)  | 10 | Spring | Chem |
| [Materials Chemistry IIIc: Solid State NMR](https://kursuskatalog.au.dk/en/course/114295/Materials-Chemistry-IIIc-Solid-State-NMR) | 10 | Fall | Chem |
| [Bio-Molecular Structure Determination](https://kursuskatalog.au.dk/en/course/111519/Bio-Molecular-Structure-Determination)  | 10 | Spring | MolBio |
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| **Recommended optional courses in relation to this specialization** |  |  |  |
|  |  |  |  |
| [RNA Molecular Biology](https://kursuskatalog.au.dk/en/course/111521/RNA-Molecular-Biology)  | 10 | Spring | MolBio |
| [Physical Chemistry IIIb: Soft Matter and Scattering Methods](https://kursuskatalog.au.dk/en/course/114324/Physical-Chemistry-IIIb-Soft-Matter-and-Scattering-Methods)  | 10 | Fall | Chem |
| [Physical Chemistry II: Reaction Dynamics](https://kursuskatalog.au.dk/en/course/114232/Physical-Chemistry-II-Reaction-Dynamics)  | 10 | Fall | Chem |
| [Individual Project in Nanoscience (5 or 10 ECTS)](https://kursuskatalog.au.dk/en/course/114225/Individual-Project-in-Nanoscience-10-ECTS)  | 5-10 | Fall/Spring | iNANO |
| [Business Project in Nanoscience](https://kursuskatalog.au.dk/en/course/114227/Business-Project-in-Nanoscience) | 10 | Fall/Spring | iNANO |

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| **Organic Nanochemistry/Soft Matter** |  |  |  |
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| **Course title** | **ECTS** | **Semester** | **Provider** |
|  |  |  |  |
| **Recommended optional courses at the Bachelor’s degree programme** |  |  |  |
|  |  |  |  |
| [Structural Chemistry I](https://kursuskatalog.au.dk/en/course/114336/Structural-Chemistry-I)  | 5 | Fall | Chem |
| [Analytical Chemistry](https://kursuskatalog.au.dk/en/course/114230/Analytical-Chemistry) | 5 | Fall | Chem |
| [Organic Chemistry II: Reaction Mechanisms](https://kursuskatalog.au.dk/en/course/111441/Organic-Chemistry-II-Reaction-Mechanisms)  | 10 | Spring | Chem |
| [Structural Chemistry IIa: Spectroscopy in Organic Chemistry](https://kursuskatalog.au.dk/en/course/111445/Structural-Chemistry-IIa-Spectroscopy-in-Organic-Chemistry)  | 5 | Spring | Chem |
| [Structural Chemistry IIb: Biophysical Chemistry](https://kursuskatalog.au.dk/en/course/111451/Structural-Chemistry-IIb-Biophysical-Chemistry)  | 5 | Spring | Chem |
| [Polymer Chemistry](https://kursuskatalog.au.dk/en/course/111706/Polymer-Chemistry)   | 10 | Spring | Eng |
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| **Specializing at the Master’s degree programme** |  |  |  |
|  |  |  |  |
| **The following must be included in the specialization** |  |  |  |
|  |  |  |  |
| [Trends in Nanoscience - Communication and Entrepreneurship](https://kursuskatalog.au.dk/en/course/111578/Trends-in-Nanoscience-Communication-and-Entrepreneurship)  | 10 | Spring | iNANO |
|  |  |  |  |
| **In combination with at least 30 ECTS from the list below** |  |  |  |
|  |  |  |  |
| [Organic Chemistry IIIa: Experimental Organic Synthesis](https://kursuskatalog.au.dk/en/course/114234/Organic-Chemistry-IIIa-Experimental-Organic-Synthesis)  | 10 | Fall | Chem |
| [Organic Chemistry IIlb: Physical Organic Chemistry](https://kursuskatalog.au.dk/en/course/114235/Organic-Chemistry-IIlb-Physical-Organic-Chemistry)  | 10 | Fall | Chem |
| [Medicinal Chemistry I: Drug Discovery and Drug Delivery](https://kursuskatalog.au.dk/en/course/111529/Medicinal-Chemistry-I-Drug-Discovery-and-Drug-Delivery)  | 10 | Spring | Chem |
|  |  |  |  |
| [Proteins and their Interactions](https://kursuskatalog.au.dk/en/course/111496/Proteins-and-their-Interactions) | 10 | Spring | MolBio |
| [Advanced Polymers and Nanomaterials](https://kursuskatalog.au.dk/en/course/114803/Advanced-Polymers-and-Nanomaterials)  | 10 | Fall | Eng |
| [Physical Chemistry IIIb: Soft Matter and Scattering Methods](https://kursuskatalog.au.dk/en/course/114324/Physical-Chemistry-IIIb-Soft-Matter-and-Scattering-Methods)  | 10 | Fall | Chem |
|  |  |  |  |
| **Recommended optional courses in relation to this specialization** |  |  |  |
|  |  |  |  |
| [Organic Chemistry IIIc: Electrochemistry and Organic Surface Chemistry](https://kursuskatalog.au.dk/en/course/114304/Organic-Chemistry-IIIc-Electrochemistry-and-Organic-Surface-Chemistry)  | 10 | Fall | Chem |
| [Organic Chemistry IV: Bioorganic Chemistry](https://kursuskatalog.au.dk/en/course/114303/Organic-Chemistry-IV-Bioorganic-Chemistry)  | 10 | Fall | Chem |
| [Medicinal Chemistry II: Chemical Biology](https://kursuskatalog.au.dk/en/course/111576/Medicinal-Chemistry-II-Chemical-Biology)  | 10 | Spring | Chem |
| [Individual Project in Nanoscience (5 or 10 ECTS)](https://kursuskatalog.au.dk/en/course/114225/Individual-Project-in-Nanoscience-10-ECTS) | 5-10 | Fall/Spring | iNANO |
| [Business Project in Nanoscience](https://kursuskatalog.au.dk/en/course/114227/Business-Project-in-Nanoscience)  | 10 | Fall/Spring | iNANO |