

The University of Liverpool: F102 Chemistry (MChem)

Year 1

| Semester 1 | Semester 2 |
|---|---|
| Introductory Organic Chemistry (30 credits) | |
| Introductory Inorganic Chemistry (15 credits) | Introductory Physical Chemistry (15 credits) |
| Introductory Spectroscopy (15 credits) | |
| Key Skills for Chemists 1 (15 credits) | |
| Foundations of Medicinal Chemistry (15 credits) | Innovative Chemistry for Energy and Materials (15 credits) |
| Or 15 credits of subsidiary modules from outside the Department | Or 15 credits of subsidiary modules from outside the Department |

Subsidiary modules can vary year to year and are subject to timetables.

Examples include: Archaeology, Life Sciences, Oceanography & Environmental Sciences, Mathematics/Physics, Computational Sciences, Open Languages.

Year 3

| Semester 1 | Semester 2 |
|--|--|
| Inorganic Materials Chemistry (15 credits) | Further Physical Chemistry (15 credits) |
| Further Organic Chemistry (15 credits) | Practical Chemistry: Introductory project (15 credits) |
| Key Skills for Chemists 3 (7.5 credits) | Catalysis (15 credits) |
| Practical Chemistry (22.5 credits) | <p>Either two 7.5 credit modules from: Advanced Functional Organic Materials Biological Energy Conversion Processes Biorenewable Chemicals from Biomass Chemistry at Surfaces Heterocyclic Chemistry & Drug Synthesis Protein Structure and Dynamics</p> <p>Or one 15 credit module: Further Analytical Chemistry</p> |
| An alternative is a 22.5 credit laboratory focussed research internship lasting for 6 weeks at Chulalongkorn University in Thailand (other options available). This takes place between years 2 and 3 and replaces some labs and optional modules in year 3. | |

Year 2

| Semester 1 | Semester 2 |
|---|---|
| Physical Chemistry II (15 credits) | |
| Organic Chemistry II (15 credits) | Coordination & Organometallic Chemistry of the d-block (15 credits) |
| Preparative Chemistry: Synthesis and Characterisation (15 credits) | Measurements in Chemistry (15 credits) |
| Key Skills for Chemists 2 (15 credits) | |
| Functional Organic Materials (15 credits) | Inorganic Applications of Group Theory (7.5 credits) |
| Or 15 credits of subsidiary modules from outside the Department | <p>One 7.5 credit module from: Applied Analytical Chemistry Chemistry for Sustainable Technologies Introduction to Medicinal Chemistry</p> <p>Or 7.5 credits of subsidiary modules from other departments</p> |
| For those interested in Science Communication, we offer a 15 credit module that can be taken in year 2 as an alternative to the optional modules suggested above. | |

Year 4

| Semester 1 | Semester 2 |
|---|--|
| Chemical Research Project (60 credits) | |
| <p>Four 7.5 credit modules from: Advanced Spectroscopy Asymmetric Synthesis and Synthetic Strategy Electrochemistry Main Group Organic Chemistry Nuclear Magnetic Resonance Spectroscopy Organic and Molecular Electronics</p> | <p>Four 7.5 credit modules from: Application of enzymes in organic synthesis – Industrial Biotechnology Applied Organic Chemistry: Synthesis of Natural Products in Industry Asymmetric Catalysis for Organic and Pharmaceutical Chemistry Introduction to Nanomedicine Nano Energy Materials Protein Structure and Dynamics Solar Energy Conversion Solid State Chemistry and Energy Storage Materials Supramolecular Chemistry</p> |

The credits give a rough estimate of course length. A 15 credit lecture course would involve the equivalent of ~30 lectures & 4-6 workshops / tutorials.

The University of Liverpool: F161 Chemistry with Research in Industry (MChem)

Year 1

| Semester 1 | Semester 2 |
|---|---|
| Introductory Organic Chemistry (30 credits) | |
| Introductory Inorganic Chemistry (15 credits) | Introductory Physical Chemistry (15 credits) |
| Introductory Spectroscopy (15 credits) | |
| Key Skills for Chemists 1 (15 credits) | |
| Foundations of Medicinal Chemistry (15 credits) | Innovative Chemistry for Energy and Materials (15 credits) |
| Or 15 credits of subsidiary modules from outside the Department | Or 15 credits of subsidiary modules from outside the Department |

Subsidiary modules can vary year to year and are subject to timetables.

Examples include: Archaeology, Life Sciences, Oceanography & Environmental Sciences, Mathematics/Physics, Computational Sciences, Open Languages.

Year 2

| Semester 1 | Semester 2 |
|---|--|
| Physical Chemistry II (15 credits) | |
| Organic Chemistry II (15 credits) | Coordination & Organometallic Chemistry of the d-block (15 credits) |
| Preparative Chemistry: Synthesis and Characterisation (15 credits) | Measurements in Chemistry (15 credits) |
| Key Skills for Chemists 2 (15 credits) | |
| Functional Organic Materials (15 credits) Or 15 credits of subsidiary modules from outside the Department | Inorganic Applications of Group Theory (7.5 credits) |
| | One 7.5 credit module from: Applied Analytical Chemistry Chemistry for Sustainable Technologies Introduction to Medicinal Chemistry Or 7.5 credits of subsidiary modules from other departments |
| For those interested in Science Communication, we offer a 15 credit module that can be taken in year 2 as an alternative to the optional modules suggested above. | |

Year 3

| Semester 1 | Semester 2 |
|---|------------|
| Industrial Placement (90 credits) | |
| Distance learning module: Advanced Chemistry (30 credits) | |

Year 4

| Semester 1 | Semester 2 |
|--|---|
| Chemical Research Project (60 credits) | |
| Four 7.5 credit modules from: Advanced Spectroscopy Asymmetric Synthesis and Synthetic Strategy Electrochemistry Main Group Organic Chemistry Nuclear Magnetic Resonance Spectroscopy Organic and Molecular Electronics | Four 7.5 credit modules from: Application of enzymes in organic synthesis – Industrial Biotechnology Applied Organic Chemistry: Synthesis of Natural Products in Industry Asymmetric Catalysis for Organic and Pharmaceutical Chemistry Introduction to Nanomedicine Nano Energy Materials Protein Structure and Dynamics Solar Energy Conversion Solid State Chemistry and Energy Storage Materials Supramolecular Chemistry |

The credits give a rough estimate of course length. A 15 credit lecture course would involve the equivalent of ~30 lectures & 4-6 workshops / tutorials.

The University of Liverpool: F1BF Medicinal Chemistry with Pharmacology (MChem)

Year 1

| Semester 1 | Semester 2 |
|---|--|
| Introductory Organic Chemistry (30 credits) | |
| Introductory Inorganic Chemistry (15 credits) | Introductory Physical Chemistry (15 credits) |
| Introductory Spectroscopy (15 credits) | |
| Key Skills for Chemists 1 (15 credits) | |
| Foundations of Medicinal Chemistry (15 credits) | Introduction to Physiology and Pharmacology (15 credits) |

Year 3

| Semester 1 | Semester 2 |
|--|--|
| Inorganic Materials Chemistry (15 credits) | Antimicrobial Chemotherapy for Chemists (15 credits) |
| Further Organic Chemistry (15 credits) | Practical Chemistry: Introductory project in a medicinal chemistry related research group (15 credits) |
| Medicinal Chemistry of Anti-Infectives (7.5 credits) | Drug Action (15 credits) |
| Key Skills for Chemists 3 (7.5 credits) | Protein Structure and Dynamics (7.5 credits) |
| Practical Chemistry (15 credits) | Heterocyclic Chemistry & Drug Synthesis (7.5 credits) |

Year 2

| Semester 1 | Semester 2 |
|--|---|
| Physical Chemistry II (15 credits) | |
| Organic Chemistry II (15 credits) | Coordination & Organometallic Chemistry of the d-block (15 credits) |
| Preparative Chemistry: Synthesis and Characterisation (15 credits) | Measurements in Chemistry (15 credits) |
| Key Skills for Chemists 2 (15 credits) | |
| Principles of Pharmacology (15 credits) | Practical Pharmacology (7.5 credits) |
| | Introduction to Medicinal Chemistry (7.5 credits) |

Year 4

| Semester 1 | Semester 2 |
|--|--|
| Chemical Research Project in a medicinal chemistry related research group (60 credits) | |
| Cardiovascular and Respiratory Pharmacology (7.5 credits) | Cancer Pharmacology (7.5 credits) |
| Drug Metabolism and Drug Response (7.5 credits) | Two 7.5 credit modules from (including at least one organic related module*): Application of enzymes in organic synthesis – Industrial Biotechnology* Applied Organic Chemistry: Synthesis of Natural Products in Industry* Asymmetric Catalysis for Organic and Pharmaceutical Chemistry* Introduction to Nanomedicine Nano Energy Materials Protein Structure and Dynamics Solar Energy Conversion Solid State Chemistry and Energy Storage Materials Supramolecular Chemistry |
| Molecular and Neuropharmacology (7.5 credits) | |
| Main Group Organic Chemistry (7.5 credits) | |
| Asymmetric Synthesis and Synthetic Strategy (7.5 credits) | |

The credits give a rough estimate of course length. A 15 credit lecture course would involve the equivalent of ~30 lectures & 4-6 workshops / tutorials.

The University of Liverpool: F103 Chemistry for Sustainable Energy (MChem)

Year 1

| Semester 1 | Semester 2 |
|--|--|
| Introductory Organic Chemistry (30 credits) | |
| Introductory Inorganic Chemistry (15 credits) | Introductory Physical Chemistry (15 credits) |
| Introductory Spectroscopy (15 credits) | |
| Key Skills for Chemists 1 (15 credits) | |
| Foundations of Medicinal Chemistry (15 credits) Or 15 credits of subsidiary modules from outside the Department | Innovative Chemistry for Energy and Materials (15 credits) |

Subsidiary modules can vary year to year and are subject to timetables.

Examples include: Archaeology, Life Sciences, Oceanography & Environmental Sciences, Mathematics/Physics, Computational Sciences, Open Languages.

Year 3

| Semester 1 | Semester 2 |
|--|--|
| Inorganic Materials Chemistry (15 credits) | Further Physical Chemistry (15 credits) |
| Further Organic Chemistry (15 credits) | Practical Chemistry: Introductory project in an energy chemistry related research group (15 credits) |
| Key Skills for Chemists 3 (7.5 credits) | Catalysis (15 credits) |
| Practical Chemistry (22.5 credits) | Biorenewable Chemicals from Biomass (7.5 credits) |
| | Biological Energy Conversion Processes (7.5 credits) |

Year 2

| Semester 1 | Semester 2 |
|--|---|
| Physical Chemistry II (15 credits) | |
| Organic Chemistry II (15 credits) | Coordination & Organometallic Chemistry of the d-block (15 credits) |
| Preparative Chemistry: Synthesis and Characterisation (15 credits) | Measurements in Chemistry (15 credits) |
| Key Skills for Chemists 2 (15 credits) | |
| Functional Organic Materials (15 credits) | Inorganic Applications of Group Theory (7.5 credits) |
| | Chemistry for Sustainable Technologies (7.5 credits) |

Year 4

| Semester 1 | Semester 2 |
|---|---|
| Chemical Research Project in an energy chemistry related research group (60 credits) | |
| Electrochemistry (7.5 credits) | Four 7.5 credit modules from (including at least two energy related modules*): Application of enzymes in organic synthesis – Industrial Biotechnology Applied Organic Chemistry: Synthesis of Natural Products in Industry Asymmetric Catalysis for Organic and Pharmaceutical Chemistry Introduction to Nanomedicine Nano Energy Materials* Protein Structure and Dynamics Solar Energy Conversion* Solid State Chemistry and Energy Storage Materials* Supramolecular Chemistry |
| Three 7.5 credit modules from: Advanced Spectroscopy Asymmetric Synthesis and Synthetic Strategy Main Group Organic Chemistry Nuclear Magnetic Resonance Spectroscopy Organic and Molecular Electronics | |

The credits give a rough estimate of course length. A 15 credit lecture course would involve the equivalent of ~30 lectures & 4-6 workshops / tutorials.

The University of Liverpool: F100 Chemistry (BSc)

Year 1

| Semester 1 | Semester 2 |
|---|---|
| Introductory Organic Chemistry (30 credits) | |
| Introductory Inorganic Chemistry (15 credits) | Introductory Physical Chemistry (15 credits) |
| Introductory Spectroscopy (15 credits) | |
| Key Skills for Chemists 1 (15 credits) | |
| Foundations of Medicinal Chemistry (15 credits) | Innovative Chemistry for Energy and Materials (15 credits) |
| Or 15 credits of subsidiary modules from outside the Department | Or 15 credits of subsidiary modules from outside the Department |

Subsidiary modules can vary year to year and are subject to timetables.

Examples include: Archaeology, Life Sciences, Oceanography & Environmental Sciences, Mathematics/Physics, Computational Sciences, Open Languages.

Year 3

| Semester 1 | Semester 2 |
|--|--|
| Inorganic Materials Chemistry (15 credits) | Modern Applications of Physical Chemistry (15 credits) |
| Further Organic Chemistry (15 credits) | Chemistry Project (15 credits) |
| Key Skills for Chemists 3 (7.5 credits) | 30 credits from the same Chemistry options as year 2 or from the following: |
| Practical Chemistry (22.5 credits) | <p>7.5 credit modules: Advanced Functional Organic Materials Biological Energy Conversion Processes Biorenewable Chemicals from Biomass Chemistry at Surfaces Heterocyclic Chemistry & Drug Synthesis</p> <p>15 credit modules include: Further Analytical Chemistry</p> |
| An alternative is a 22.5 credit laboratory focussed research internship lasting for 6 weeks at Chulalongkorn University in Thailand (other options available). This takes place between years 2 and 3 and replaces some labs and optional modules in year 3. | |

Year 2

| Semester 1 | Semester 2 |
|--|---|
| Physical Chemistry II (15 credits) | |
| Organic Chemistry II (15 credits) | Coordination & Organometallic Chemistry of the d-block (15 credits) |
| Preparative Chemistry: Synthesis and Characterisation (15 credits) | Measurements in Chemistry (15 credits) |
| Key Skills for Chemists 2 (15 credits) | |
| Functional Organic Materials (15 credits) | Two 7.5 credit modules from: |
| Or 15 credits of subsidiary modules from outside the Department | Applied Analytical Chemistry Chemistry for Sustainable Technologies Inorganic Applications of Group Theory Introduction to Medicinal Chemistry Or 15 credits of subsidiary modules from other departments |
| For those interested in Science Communication, we offer a 15 credit module that can be taken in year 2 or 3 as an alternative to the optional modules suggested. | |

The credits give a rough estimate of course length. A 15 credit lecture course would involve the equivalent of ~30 lectures & 4-6 workshops / tutorials.

The University of Liverpool: F111 Chemistry with a Year in Industry (BSc)

Year 1

| Semester 1 | Semester 2 |
|---|---|
| Introductory Organic Chemistry (30 credits) | |
| Introductory Inorganic Chemistry (15 credits) | Introductory Physical Chemistry (15 credits) |
| Introductory Spectroscopy (15 credits) | |
| Key Skills for Chemists 1 (15 credits) | |
| Foundations of Medicinal Chemistry (15 credits) | Innovative Chemistry for Energy and Materials (15 credits) |
| Or 15 credits of subsidiary modules from outside the Department | Or 15 credits of subsidiary modules from outside the Department |

Subsidiary modules can vary year to year and are subject to timetables.

Examples include: Archaeology, Life Sciences, Oceanography & Environmental Sciences, Mathematics/Physics, Computational Sciences, Open Languages.

Year 3

| Semester 1 | Semester 2 |
|----------------------|------------|
| Industrial Placement | |

Year 2

| Semester 1 | Semester 2 |
|--|---|
| Physical Chemistry II (15 credits) | |
| Organic Chemistry II (15 credits) | Coordination & Organometallic Chemistry of the d-block (15 credits) |
| Preparative Chemistry: Synthesis and Characterisation (15 credits) | Measurements in Chemistry (15 credits) |
| Key Skills for Chemists 2 (15 credits) | |
| Functional Organic Materials (15 credits) | Two 7.5 credit modules from: |
| Or 15 credits of subsidiary modules from outside the Department | Applied Analytical Chemistry Chemistry for Sustainable Technologies Inorganic Applications of Group Theory Introduction to Medicinal Chemistry |
| | Or 15 credits of subsidiary modules from other departments |
| For those interested in Science Communication, we offer a 15 credit module that can be taken in year 2 or 4 as an alternative to the optional modules suggested. | |

Year 4

| Semester 1 | Semester 2 |
|--|--|
| Inorganic Materials Chemistry (15 credits) | Modern Applications of Physical Chemistry (15 credits) |
| Further Organic Chemistry (15 credits) | Chemistry Project (15 credits) |
| Key Skills for Chemists 3 (7.5 credits) | 30 credits from the same Chemistry options as year 2 or from the following: |
| Practical Chemistry (22.5 credits) | 7.5 credit modules: Advanced Functional Organic Materials Biological Energy Conversion Processes Biorenewable Chemicals from Biomass Chemistry at Surfaces Heterocyclic Chemistry & Drug Synthesis |
| | 15 credit modules include: Further Analytical Chemistry |

The credits give a rough estimate of course length. A 15 credit lecture course would involve the equivalent of ~30 lectures & 4-6 workshops / tutorials.

The University of Liverpool: F1B2 Medicinal Chemistry (BSc)

Year 1

| Semester 1 | Semester 2 |
|---|--|
| Introductory Organic Chemistry (30 credits) | |
| Introductory Inorganic Chemistry (15 credits) | Introductory Physical Chemistry (15 credits) |
| Introductory Spectroscopy (15 credits) | |
| Key Skills for Chemists 1 (15 credits) | |
| Foundations of Medicinal Chemistry (15 credits) | Introduction to Physiology and Pharmacology (15 credits) |

Year 3

| Semester 1 | Semester 2 |
|--|--|
| Further Organic Chemistry (15 credits) | Chemistry Project (15 credits) |
| Medicinal Chemistry of Anti-Infectives (7.5 credits) | Drug Action (15 credits) |
| Key Skills for Chemists 3 (7.5 credits) | Antimicrobial Chemotherapy for Chemists (15 credits) |
| Practical Chemistry (22.5 credits) | Heterocyclic Chemistry & Drug Synthesis (7.5 credits) |
| | <p>Either two 7.5 credit modules from: Applied Analytical Chemistry Biological Energy Conversion Processes Biorenewable Chemicals from Biomass Chemistry at Surfaces Chemistry for Sustainable Technologies Inorganic Applications of Group Theory</p> <p>Or one 15 credit module: Further Analytical Chemistry</p> |
| An alternative is a 22.5 credit laboratory focussed research internship lasting for 6 weeks at Chulalongkorn University in Thailand (other options available). This takes place between years 2 and 3 and replaces some labs and optional modules in year 3. | |

Year 2

| Semester 1 | Semester 2 |
|--|---|
| Physical Chemistry II (15 credits) | |
| Organic Chemistry II (15 credits) | Coordination & Organometallic Chemistry of the d-block (15 credits) |
| Preparative Chemistry: Synthesis and Characterisation (15 credits) | Measurements in Chemistry (15 credits) |
| Key Skills for Chemists 2 (15 credits) | |
| Principles of Pharmacology (15 credits) | Practical Pharmacology (7.5 credits) |
| | Introduction to Medicinal Chemistry (7.5 credits) |

The credits give a rough estimate of course length. A 15 credit lecture course would involve the equivalent of ~30 lectures & 4-6 workshops / tutorials.