

Queen Mary Summer School 2020

SUM501Q Chemistry for Today and Tomorrow: From Bench to Market
School of Biological & Chemical Sciences

Course outline

Date: 20 July - 7 August 2020

Level: 5

Credits: 15 (Queen Mary credits)

Course leader: Dr Zoe Wilson (z.wilson@qmul.ac.uk) and Dr Giorgio Chianello (g.chianello@qmul.ac.uk)

Assessment: Team project (100%)

Course description:

Chemistry is an ever-evolving field, but this is something which is sometimes hard to capture in an undergraduate chemistry course. This course will take advantage of small class sizes and the excellent resources of Queen Mary and the greater London area to expand on your fundamental studies and give students a wide-ranging view on what working in the field of chemistry really looks like today.

Students will achieve a broad understanding of modern chemistry techniques, such as nanomaterials and flow chemistry, and their applications through hands-on experience in the laboratory, discussions with experts and group activities. Students will also learn of the increasing challenges which face research and industrial chemists and how these challenges are being addressed as we move forward to the future.

Learning outcomes:

On completion of the module, students can expect to have acquired the ability to:

Academic content

- evaluate the applications of polymeric nanomaterials in material science/pharmaceuticals.
- gain an understanding of modern flow chemistry techniques and their applications.
- investigate the increasing pressures on modern chemistry to be “green” and how this is shaping both research and chemical production.
- gain hands on experience with modern characterisation techniques such as transmission electron microscopy and nuclear magnetic resonance spectroscopy.

Discipline-specific skills

- design, develop and synthesise polymeric nanomaterials.
- use state of the art equipment such as dynamic light scattering to characterise polymeric nanomaterials and interpret the data collected
- work collaboratively on team-based tasks.

General intellectual attributes

- communicate effectively by written and verbal means
- manage time, prioritise workloads and work to deadlines as a transferable key skill to help students with career goals and continuing education
- participate constructively as a member of a group/team, respect the opinions of others and act inclusively as responsible learners
- ability to locate information and be competent in the use of information technology

Approximate cost:

The tuition fees for the **Chemistry for Today and Tomorrow: From Bench to Market** course are **£1,700**. All reading material is provided digitally so you are not required to purchase any books.

Assessments:

The course assessments are not compulsory, however, if you wish to transfer credit for this course to your home university it is essential to complete the assignments.

Team project (100%)

Preparation:

Before you arrive on campus, it is advised that you familiarise yourself with the course content before it begins. You will be given instructions for accessing our Virtual Learning Environment (QMplus) before you arrive on campus.

Teaching:

The course is taught in two two-hour sessions per day (10.00 - 12.00 and 13.00 - 15.00), held Monday to Thursday each week. Teaching in lectures and tutorials will be supplemented with guest lectures from industry experts, hands-on experience in Queen Mary's cutting-edge research laboratories and a field trip in London to explore the history and future of chemistry as a science.

Course content:

Session 1	Introduction to the course and tour of the laboratory
Session 2	Nanomaterials introduction
Session 3	Green Chemistry lecture and laboratory
Session 4	Nanomaterial synthesis and characterisation I
Session 5	Flow Chemistry lecture and demonstration
Session 6	Lab on Flow Chemistry
Session 7	Nanomaterial synthesis and characterisation II
Session 8	Lab on Nanomaterials Preparation
Session 9	Lab on Nanomaterials Characterisation
Session 10	Symposium and networking
Session 11	Project presentations

Please note that the information provided may be subject to change.