Course Specification

Published Date:	14-Sep-2020
Produced By:	Laura Clode
Status:	Validated

Core Information

Awarding Body / Institution:	University of Wolverhampton		
School / Institute:	Wolverhampton School of Sciences		
Course Code(s):	CH009H01UV CH009H31UV	Full-time Part-time	3 Years 6 Years
UCAS Code:	F102		
Course Title:	BSc (Hons) Chemistry with Chemical Engineering		
Hierarchy of Awards:	Bachelor of Science with Honours Chemistry with Chemical Engineering Bachelor of Science Chemistry with Chemical Engineering Diploma of Higher Education Chemistry with Chemical Engineering Certificate of Higher Education Chemistry with Chemical Engineering University Statement of Credit University Statement of Credit		
Language of Study:	English		
Date of DAG approval:	25/Sep/2017		
Last Review:	2016/7		
Course Specification valid from:	2016/7		
Course Specification valid to:	2022/3		

Academic Staff

Course Leader:	Dr Michael Whitehead
Head of Department:	Georgina Manning

Course Information

Location of Delivery:	University of Wolverhampton
Category of Partnership:	Not delivered in partnership
Teaching Institution:	University of Wolverhampton
Open / Closed Course:	This course is open to all suitably qualified candidates.

Entry Requirements:

Entry requirements are subject to regular review. The entry requirements applicable to a particular academic year will be published on the University website (and externally as appropriate e.g. UCAS

All courses:

- GCSE English and Mathematics at grade C or above or equivalent AND
- Minimum 96 UCAS points in the NEW tariff system (e.g. CCC) from three full A-levels (preferably the sciences and maths, one of which must be chemistry with a minimum of C = 32 points). This is equivalent to 240 points with the old UCAS tariff with C = 80 points.

Qualifications considered to be the equivalent of the above will be considered by the university. If you've got other qualifications or relevant experience, please check out the UCAS tariff conversion table via the UCAS website: www.ucas.com.

International student language requirements and application guidance can be found at www.wlv.ac.uk/international/apply

Other requirements: An offer of a place will not be made until you have attended a formal interview.

Distinctive Features of the Course:

Chemistry and Chemical Engineering each comprise a broad range of scientific skills; laboratory-based, academically based and transferable (professional skill) based. Such science graduates are numerate, practical, flexible and good at problem solving. Chemistry and Chemical Engineering graduates are in short supply compared to demand. These industries demand their own speciality graduates but because of the interplay between the subjects there are many instances when chemical companies require chemists with an understanding of pharmaceutical science, chemical engineering and vice versa.

Educational Aims of the Course:

BSc (Hons) Chemistry with Chemical Engineering

- Develop your skills and knowledge in the main areas of chemistry (organic, inorganic, physical and analytical chemistry) in an integrated manner but enable the students to develop a strong awareness of the specialist application of chemical engineering in an industrial setting. This will encompass an introduction to chemical engineering, thermodynamics and fluids and then develop knowledge in transport processes and fluid dynamics, reaction engineering and incorporate a chemistry based research project. In addition, if you choose to undertake a sandwich degree, the course will allow the student to acquire technical skills in the workplace and enable them to integrate knowledge gained in the theoretical aspects of the course into the professional environment.
- Produce a graduate who is "fit for purpose" who is ready for employment in the chemistry or a related industry, or who can progress to teaching, further study or research aspirations.

Intakes:

September

Major Source of Funding:

Office for Students (OFS)

Tuition Fees:

Tuition fees are reviewed on an annual basis. The fees applicable to a particular academic year will be published on the University website.

Year	Status	Mode	Amount
2020/1	H	Full Time / Sandwich	£9250.00
2020/1	Overseas	Full Time / Sandwich	£12250.00
2020/1	H	Part Time	£3050.00
2020/1	Overseas	Part Time	£6125.00

PSRB:

None

Course Structure:

September (Full-time)

Part time students study alongside full time students. However, they do not study more than 80 credits in each academic calendar year.

Year 1

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
4ET011	Principles of Chemical Engineering	20	SEM1	Core
4CH002	Principles of Physical Chemistry	20	SEM2	Core
4ET004	Thermodynamics and Fluids I	20	SEM2	Core
4CH003	Fundamentals of Organic Chemistry	20	SEM1	Core
4CH001	Concepts in Inorganic Chemistry	20	SEM1	Core
4CH004	Introduction to Analytical Chemistry	20	SEM2	Core

September (Full-time)

Part time students study alongside full time students. However, they do not study more than 80 credits in each academic calendar year.

Year 2

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
5ET030	Transport Processes	20	SEM1	Core
5CH004	Inorganic Chemistry	20	SEM1	Core
5CH003	Physical Chemistry	20	SEM1	Core
5CH002	Organic Chemistry (Structure and Mechanism)	20	SEM2	Core
5CH001	Chemical Analysis	20	SEM2	Core
5ET015	Reaction Engineering	20	SEM2	Core

September (Full-time)

Part time students study alongside full time students. However, they do not study more than 80 credits in each academic calendar year.

Year 3

Full time and Sandwich Undergraduate Honours students normally study 120 credits per academic year; 60 credits semester 1 and 60 credits semester 2.

Module	Title	Credits	Period	Type
6CH003	Quality Assurance and Laboratory Management	20	SEM1	Core
6CH007	Chemistry Research Project	40	YEAR	Core
6ET025	Environmental Engineering	20	SEM1	Core
6ET013	Petroleum Chemistry and Refining	20	SEM2	Core
6CH004	Advanced Physical and Materials Chemistry	20	SEM2	Core

Please note: Optional modules might not run every year, the course team will decide on an annual basis which options will be running, based on student demand and academic factors, to create the best learning experience.

Learning, Teaching and Assessment

Academic Regulations Exemption:

None

Reference Points:

UK Quality Code for Higher Education https://www.qaa.ac.uk/quality-code

UK Quality Code for Higher Education Advice & Guidance https://www.qaa.ac.uk/en/quality-code/advice-and-guidance

Subject Benchmark Statements https://www.qaa.ac.uk/en/quality-code/subject-benchmark-statements

Qualifications and Credit Frameworkshttps://www.qaa.ac.uk/en/quality-code/qualifications-and-credit-

frameworks

Learning Outcomes:

CertHE Course Learning Outcome 1 (CHECLO1)

Demonstrate knowledge of the underlying concepts and principles associated with your area(s) of study, and an ability to evaluate and interpret these within the context of that area of study.

CertHE Course Learning Outcome 2 (CHECLO2)

Demonstrate an ability to present, evaluate and interpret qualitative and quantitative data, in order to develop lines of argument and make sound judgements in accordance with basic theories and concepts of your subject(s) of study.

CertHE Course Learning Outcome 3 (CHECLO3)

Evaluate the appropriateness of different approaches to solving problems related to your area(s) of study and/or work.

CertHE Course Learning Outcome 4 (CHECLO4)

Communicate the results of your study/work accurately and reliably, and with structured and coherent arguments.

CertHE Course Learning Outcome 5 (CHECLO5)

Demonstrate the qualities and transferable skills necessary for employment requiring the exercise of some personal responsibility.

DipHE Course Learning Outcome 1 (DHECLO1)

Demonstrate knowledge and critical understanding of the well-established principles of your area(s) of study, and of the way in which those principles have developed with an understanding of the limits of your knowledge, and how this influences analyses and interpretations based on that knowledge.

DipHE Course Learning Outcome 2 (DHECLO2)

Demonstrate the ability to apply underlying concepts and principles outside the context in which they were first studied, including, where appropriate, the application of those principles in an employment context.

DipHE Course Learning Outcome 3 (DHECLO3)

Demonstrate knowledge of the main methods of enquiry in the subject(s) relevant to the named award, and ability to evaluate critically the appropriateness of different approaches to solving problems in the field of study.

DipHE Course Learning Outcome 4 (DHECLO4)

Use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis.

DipHE Course Learning Outcome 5 (DHECLO5)

Effectively communicate information, arguments and analysis in a variety of forms to specialist and non-specialist audiences, and deploy key techniques of the discipline effectively.

DipHE Course Learning Outcome 6 (DHECLO6)

Demonstrate the qualities and transferable skills necessary for employment, requiring the exercise of personal responsibility and decision-making and undertake further training, developing existing skills and acquire new competences that will enable them to assume significant responsibility within organisations.

Ordinary Degree Course Learning Outcome 1 (ORDCLO1)

Demonstrate a systematic understanding of key aspects of your field of study, including acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of defined aspects of a discipline with an appreciation of the uncertainty, ambiguity and limits of knowledge.

Ordinary Degree Course Learning Outcome 2 (ORDCLO2)

Demonstrate a systematic understanding of key aspects of your field of study, including acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of defined aspects of a discipline with an appreciation of the uncertainty, ambiguity and limits of knowledge.

Ordinary Degree Course Learning Outcome 3 (ORDCLO3)

Demonstrate conceptual understanding that enables the student: (a) to devise and sustain arguments, and/or to solve problems, using ideas and techniques, some of which are at the forefront of a discipline (b) to describe and comment upon particular aspects of current research, or equivalent advanced scholarship, in the discipline.

Ordinary Degree Course Learning Outcome 4 (ORDCLO4)

Demonstrate the ability to manage your own learning, and to make use of scholarly reviews and primary sources (for example, refereed research articles and/or original materials appropriate to the discipline) and communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.

Ordinary Degree Course Learning Outcome 5 (ORDCLO5)

Critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete), to make judgements, and to frame appropriate questions to achieve a solution - or identify a range of solutions - to a problem.

Ordinary Degree Course Learning Outcome 6 (ORDCLO6)

Demonstrate the qualities and transferable skills necessary for employment requiring: (a) the exercise of initiative and personal responsibility (b) decision-making in complex and unpredictable contexts (c) the learning ability needed to undertake appropriate further training of a professional or equivalent nature.

Honours Degree Course Learning Outcome 1 (DEGCLO1)

Demonstrate practical skills, work safely in the laboratory and be fully conversant with a selection of standard chemical techniques, instrumentation and use of appropriate computer software.

Honours Degree Course Learning Outcome 2 (DEGCLO2)

Survey and critically review scientific information, communicate effectively both orally and in writing, apply numerical skills to scientific data, and work in teams and independently.

Honours Degree Course Learning Outcome 3 (DEGCLO3)

Demonstrate a good conceptual understanding of chemistry and apply knowledge of a range of inorganic, organic, physical and analytical chemistry.

Honours Degree Course Learning Outcome 4 (DEGCLO4)

Understand a selection of concepts and technologies that are appropriate to Chemical Engineering.

Honours Degree Course Learning Outcome 5 (DEGCLO5)

Demonstrate the qualities and transferable skills necessary for employment requiring:
(a) the exercise of initiative and personal responsibility
(b) decision-making in complex and unpredictable contexts
(c) the learning ability needed to undertake appropriate further training of a professional or equivalent nature.

Overview of Assessment:

Module	Title	Course Learning Outcomes
4CH001	Concepts in Inorganic Chemistry	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
4CH002	Principles of Physical Chemistry	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
4CH003	Fundamentals of Organic Chemistry	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
4CH004	Introduction to Analytical Chemistry	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
4ET004	Thermodynamics and Fluids I	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
4ET011	Principles of Chemical Engineering	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
5CH001	Chemical Analysis	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5CH002	Organic Chemistry (Structure and Mechanism)	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5CH003	Physical Chemistry	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5CH004	Inorganic Chemistry	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5ET015	Reaction Engineering	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5ET030	Transport Processes	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
6CH003	Quality Assurance and Laboratory Management	DEGCLO1, DEGCLO2, DEGCLO3
6CH004	Advanced Physical and Materials Chemistry	DEGCLO1, DEGCLO2, DEGCLO3
6CH007	Chemistry Research Project	DEGCLO1, DEGCLO2, DEGCLO5
6ET013	Petroleum Chemistry and Refining	DEGCLO1, DEGCLO2, DEGCLO3, DEGCLO4, DEGCLO5
6ET025	Environmental Engineering	DEGCLO1, DEGCLO2, DEGCLO3, DEGCLO4, DEGCLO5

Teaching, Learning and Assessment:

The University's Learning, Teaching and Assessment Sub-Strategy 2012-2017 was consulted. We aim to develop students who are critically reflective, entrepreneurial, employable, digitally literate, well networked and socially responsible.

It is important that students should be aware of several key industrial, environmental and other applied and research aspects of chemistry. Throughout the course, students will consider the role that chemistry plays in the broader context of chemistry-related disciplines, either pharmaceutically or chemical engineering related.

This will be achieved through the diet of specialist pharmaceutical sciences related modules or chemical engineering modules pertinent to each of the chemistry "with" courses.

Throughout each course the students will use a range of standard and specialist software to prepare and present reports, assignments, presentations, etc across a wide range of modules, with increasing sophistication. Students will be expected to make use of the Universities virtual on-line learning framework for accessing module information, submitting assignments, formative self-testing, engaging in module fora, etc. Students will be expected to make use of email for module and other University communications. One aspect of the course will encompass the use of chemistry based software such as Knowitall, molecular modelling packages and use of packages such as Excel or Graphpad Prism to manipulate data.

By the end of their course, students should be comfortable with, and be competent in, the digital world and have the flexibility to adapt to a wide range of digital activities.

The chemistry "with" course develops students' knowledge base and skills in Chemistry using the subject specific module content of core chemistry modules. In addition, the development of transferable skills improves and enhances employability beyond the field of chemistry, and indeed science in general.

The emphasis on the students moving to a student centred learning approach simultaneously fosters the development of transferrable skills, together with group learning and problem solving approaches. Students are encouraged to reflect upon their learning experience and to extrapolate from this the skills that would make them stand out in their respective career pathways. Students will also be directed to the relevant careers support services in the University. In addition, the RSC offers extensive careers support.

There will be a range of learning activities, as indeed there will be a range of assessment patterns. The typical learning activities that will be employed can be listed as follows:

Traditional face to face lectures with some e-lecture/podcasts.

Traditional tutorial activity with some e-tutorial work.

Hands on "in the laboratory" practical activity (working singly, in pairs and in groups where appropriate), with some e-preparation for laboratory skills.

Workshop/seminars (working in groups and including problem solving, problem-based learning).

Typically, students will be presented with theoretical information in lecture sessions and then will use workshops, group tutorials, seminars, on-line fora, electronic tutorials, directed reading and a range of IT-based activities and formative assessments to develop these concepts.

Practical skills will be developed throughout each course. The level 4 practical work will be directed towards developing basic laboratory skills, which are subsequently built upon at levels 5. Thus, as the student develops, there is a gradual shift from students carrying out simple practical work, where the practical schedules are provided to them, towards more extensive (multiple week) problem solving practical exercises, and typically culminating in the 20 credit research project at level 6. At level 6, students will be expected to apply many of the practical skills that they have learned throughout their course to a relatively small 20 credit research project in their area of interest.

The learning activities shall be focused on moving from a more tutor-centred approach in the earlier parts of the course towards a student-centred learning approach in the latter stages.

Thus, level 4 modules tend to involve tutor-led sessions, with defined student directed activities, whereas level 6 modules are more student-centred, with tutors acting to facilitate students' learning. Some of the latter theory modules will involve key note lectures only, with students being required to undergo significant independent research and learning to work up selected advanced topics, of direct relevance to industry and/or our research programmes.

There is little mention of specific reference transferable (professional) skills in the University's Learning, Teaching and Assessment Sub-Strategy 2012-2017 although these will be key (see below) to the large Chemistry element of each programme.

Assessment Methods:

At the University of Wolverhampton, a variety of modes of assessment will be used to support and test your learning and progress and to help you develop capabilities that are valued beyond your University studies and into your working life. Your course may include a variety of assessment activities:

Written examinations (including online examinations, open and closed book examinations and quizzes)
Coursework (for example, essays, reports, portfolios, project proposals and briefs, CVs, poster presentation)
Practical (for example, oral and video presentations, laboratory work, performances, practical skills assessment)

In the final year of your undergraduate degree, and at the end of your postgraduate degree, you are likely to be expected to write an extended piece of work or research, such as a dissertation or a practice-based piece of research.

Student Support:

General University support:

University Learning Centres are the key source of academic information for students. Learning Centres provide physical library resources (books, journal, DVDs etc.) and offer a range of study areas to allow students to study in the environment that suit them best: Social areas, quiet and silent areas. Learning Centres also provide access to wide range of online information sources, including eBooks, e-Journals and subject databases.

Learning Centres also provide students with academic skills support via the Skills for Learning programme. Students on campus can attend workshops or ask for one-to-one help on a range of skills such as academic writing and referencing. Students can access a range of online skills material at: www.wlv.ac.uk/lib/skills

The University Student Support website offers advice on a variety of matters (careers, counselling, student union advice, etc.) Students can also access these services by booking appointment with the SU, careers, counselling services, etc.

Employability in the Curriculum:

The following have been identified as important for our Chemistry related programmes. Student facing module guides will indicate how each Chemistry module maps to one or more of the professional/transferable skills.

The following skills will be developed during levels 4-6:

1. Communication skills, covering both written and oral communication
2. Problem-solving skills, relating to qualitative and quantitative information
3. Numeracy and mathematical skills, including such aspects as error analysis order-of-magnitude estimations, correct use of units and modes of data presentation
4. Information retrieval skills, in relation to primary and secondary information sources, including information retrieval through online computer searches
5. IT skills
6. Interpersonal skills, relating to the ability to interact with other people and to engage in teamworking
7. Time management and organisational skills, as evidenced by the ability to plan and implement efficient and effective modes of working
8. Skills needed to undertake appropriate further training of a professional nature.

The students will be versed in use of the RSC's Undergraduate Skills Recording (USR) tool to annually record and reflect on their skills development as the course proceeds.

The process of ePDP building commences in the first semester, with students being introduced to the RSC Undergraduate Skills recording (USR) platform. Students are encouraged to develop an ability to self-reflect

on their weaknesses and strengths and plan how to develop those weaknesses. The USR platform is used as a training tool for continuing professional development.

Some modules will use a “self-monitoring progress chart” to encourage reflective thinking by the students, to identify and address perceived areas of weakness as they progress through their course. This is designed to encourage students to pro-actively engage in taking responsibility for their own learning process, and evidence their own learning.

The advantage of this is that students will start to develop their career and personal development strategies.

The electronic interface means that ePDPs can be made available to prospective employers if students are building evidence-based job applications. In addition, a chemistry graduate who wishes to work towards Chartered Chemistry status via a process of continuing professional development will be well versed with portfolio construction to facilitate this process.