Course Specification

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Produced By:	Oliver Jones
Status:	Validated

Core Information

Awarding Body / Institution:	University of Wolverhampton		
School / Institute:	Wolverhampton School of Sciences		
Course Code(s):	CH011H01UV CH011H31UV	Full-time Part-time	3 Years 6 Years
UCAS Code:	H810		
Course Title:	BSc (Hons) Chemical Engineering with Chemistry		
Hierarchy of Awards:	Bachelor of Science with Honours Chemical Engineering with Chemistry Bachelor of Science Chemical Engineering with Chemistry Diploma of Higher Education Chemical Engineering with Chemistry Certificate of Higher Education Chemical Engineering with Chemistry 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:	Professor Phil Cox
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 PLUS C=32 points in Maths). 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:

This degree aims to:

- develop your skills and knowledge in the main areas of chemistry (organic, inorganic, physical and analytical chemistry) and also enable you to develop a strong awareness of the specialist application of chemistry to pharmaceutical science. This will encompass the physicochemical nature of drugs, the molecular basis of life, practical pharmaceutical techniques, the principles of drug development and formulation and advanced pharmaceutical formulation. In addition if you choose to undertake a Sandwich degree then the course will allow you to acquire technical skills in the workplace and enable you 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/pharmaceutical or a related industry, or who can progress to teaching, further study or research aspirations.

Educational Aims of the Course:

You will have studied a core of organic, inorganic, physical and analytical chemistry, the pillars of what can be considered to be "the central science" and have an integrated knowledge of these main areas of chemistry together with good practical skills, literacy, numeracy. You will have a high level of IT skills and be capable of logical, scientific, critical thinking and problem solving. In addition you will have studied many of the essential concepts of Pharmaceutical Science and will understand much of the principles and language of these sciences at the interface of chemistry. These skills will make you well equipped for the workplace, be it in a pharmaceutical science, chemistry or chemistry related environment or the wider world of work in general. You will also be well placed for further study and/or research if you so choose.

Intakes:

September
January

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:

January (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	SEM3	Core
4MA007	Engineering Mathematics	20	SEM3	Core
4ET004	Thermodynamics and Fluids I	20	SEM2	Core
4ET012	Unit Operations	20	SEM2	Core
4CH002	Principles of Physical Chemistry	20	SEM2	Core

4CH003	Fundamentals of Organic Chemistry	20	SEM1	Core
5ET030	Transport Processes	20	SEM1	Core
5ET032	Fluid Mechanics and Multiphase Systems	20	SEM1	Core
5CH003	Physical Chemistry	20	SEM1	Core
5ET015	Reaction Engineering	20	SEM1	Core

January (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
5ET014	Unit Processes and design	20	SEM2	Core
5CH001	Chemical Analysis	20	SEM2	Core

6ET025	Environmental Engineering	20	SEM1	Core
6CH003	Quality Assurance and Laboratory Management	20	SEM1	Core
6ET012	Design Project	40	CRYRA	Core

January (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
6ET014	Process Dynamics and Control	20	SEM2	Core
6CH004	Advanced Physical and Materials 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 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
4MA007	Engineering Mathematics	20	SEM1	Core
4CH003	Fundamentals of Organic Chemistry	20	SEM1	Core
4ET004	Thermodynamics and Fluids I	20	SEM2	Core
4ET012	Unit Operations	20	SEM2	Core
4CH002	Principles of Physical 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
5ET032	Fluid Mechanics and Multiphase Systems	20	SEM1	Core
5CH003	Physical Chemistry	20	SEM1	Core
5ET015	Reaction Engineering	20	SEM1	Core
5ET014	Unit Processes and design	20	SEM2	Core
5CH001	Chemical Analysis	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
6ET025	Environmental Engineering	20	SEM1	Core
6CH003	Quality Assurance and Laboratory Management	20	SEM1	Core
6ET014	Process Dynamics and Control	20	SEM2	Core
6CH004	Advanced Physical and Materials Chemistry	20	SEM2	Core
6ET012	Design Project	40	YEAR	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:

Quality Code -. Including :

Qualifications Frameworks

Characteristics Statements

Credit Frameworks

Subject Benchmark Statements – *list*

Chemical Engineering "with" courses.

In the initial years of the course we will not look for accreditation of the Chemical Engineering "with" courses with the IChemE. Undergraduate courses that have accredited status carry a considerable points tariff especially for mathematics. Although the need for strong mathematics is appropriate for a full Chem Eng degree it doesn't allow for recruitment from a broader community. Thus "the with" courses will provide the students with a strong skill set with which to gain employment and in the cases where a design project is taken in the third year allow for later application to chartered status. This has been discussed with IChemE and the University of Huddersfield who have run a similar and very successful course for many years.

Quality Code - Part B: Assuring and Enhancing Academic Quality

University Policies and Regulations

We have also referred to internal documents such as the University of Wolverhampton's Teaching, Learning and Assessment Sub Strategy (2012-2017) and current Academic Regulations (2016-17).

Equality Act (2010)

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 an ability to deploy accurately established techniques of analysis and enquiry within a discipline and apply the methods and techniques that they have learned to review, consolidate, extend and apply your knowledge and understanding, and to initiate and carry out projects.

Ordinary Degree Course Learning Outcome 3 (ORDCLO3)

Demonstrate conceptual understanding that enables the student: 1. to devise and sustain arguments, and/or to solve problems, using ideas and techniques, some of which are at the forefront of a discipline 2. 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: 1. the exercise of initiative and personal responsibility 2. decision-making in complex and unpredictable contexts 3. the learning ability needed to undertake appropriate further training of a professional or equivalent nature.

Honours Degree Course Learning Outcome 1 (DEGCLO1)

Show an understanding and appreciation of hazard and operability, safety and ethical principles in a chemical process environment.

Honours Degree Course Learning Outcome 2 (DEGCLO2)

Demonstrate knowledge and critical understanding of the principles and principle numerical methods of chemical engineering.

Honours Degree Course Learning Outcome 3 (DEGCLO3)

Show a critical understanding of process engineering, plant and reactor design, and their implications for practice.

Honours Degree Course Learning Outcome 4 (DEGCLO4)

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

Honours Degree Course Learning Outcome 5 (DEGCLO5)

Demonstrate relevant personal and interpersonal skills, and thinking critically and creatively during problem solving especially when faced with engineering challenges.

Overview of Assessment:

Module	Title	Course Learning Outcomes
4CH002	Principles of Physical Chemistry	CHECLO1, CHECLO2, CHECLO3, CHECLO4
4CH003	Fundamentals of Organic Chemistry	CHECLO1, CHECLO2, CHECLO3, CHECLO4
4ET004	Thermodynamics and Fluids I	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
4ET011	Principles of Chemical Engineering	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
4ET012	Unit Operations	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
4MA007	Engineering Mathematics	CHECLO1, CHECLO2, CHECLO3, CHECLO4, CHECLO5
5CH001	Chemical Analysis	DHECLO1, DHECLO2, DHECLO3, DHECLO4
5CH003	Physical Chemistry	DHECLO1, DHECLO2, DHECLO3, DHECLO4
5ET014	Unit Processes and design	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5ET015	Reaction Engineering	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5ET030	Transport Processes	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
5ET032	Fluid Mechanics and Multiphase Systems	DHECLO1, DHECLO2, DHECLO3, DHECLO4, DHECLO5, DHECLO6
6CH003	Quality Assurance and Laboratory Management	DEGCLO4, ORDCLO4
6CH004	Advanced Physical and Materials Chemistry	DEGCLO4, ORDCLO4
6CH006	Research Project	DEGCLO1, DEGCLO2, DEGCLO3, DEGCLO4, DEGCLO5, ORDCLO1, ORDCLO2, ORDCLO3, ORDCLO4, ORDCLO5
6ET012	Design Project	DEGCLO1, DEGCLO2, DEGCLO3, DEGCLO4, DEGCLO5, ORDCLO1, ORDCLO2, ORDCLO3, ORDCLO4, ORDCLO5
6ET025	Environmental Engineering	DEGCLO2, DEGCLO4, DEGCLO5, ORDCLO2, ORDCLO4, ORDCLO5

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 chemical engineering and chemistry modules.

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 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 develops students' knowledge base and skills in Chemical Engineering using the subject specific module content of core Chemical Engineering. In addition, the development of transferable skills improves and enhances employability beyond the field 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.

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.

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:

Each student will be allocated a personal tutor who can provide general help, advice, guidance and, if required, direct them to services such as "Here2Help", Counselling Services, Student Enabling Centre, Student's Union, Chaplaincy (all Faiths), Study Skills (Learning centre, see below).

Module-specific support is provided through the module team via face-to-face and electronic tutorials, scheduled drop-in sessions or SAMS (Student Appointment Management System) appointments.

The team of demonstrators provides drop-in sessions for specific module queries and also more general study skills advice. Feedback from formative and some summative assessments is designed to support learning by assisting the student in identifying and improving areas of weakness, and further developing areas of strength.

The Faculty of Science and Engineering also offers a Student Support Team (located in the Faculty Administration Office) and this is a key additional source of support, particularly for non-academic related matters. This tends to be a student's first port of call and the team can advise students and, if required direct them to further University services as mentioned above.

There are also a range of support facilities (relating to assessment tasks) that are available in the Learning Centre for students to access. The Skills for Learning programme provides opportunities to develop academic study skills, which will support you in your assessment tasks. Face to face activities, including workshops, drop-in sessions and appointments are available in Learning Centres. A wide range of support materials such as videos, study guides, interactive tasks, and self-study packages can be accessed online. Details of all support is available from www.wlv.ac.uk/skills .

These can be found in the skills zone and can be booked (some are drop in sessions). The following are included:

- Skills for learning
- Finding information
- Study Guides
- Writing at University
- Referencing
- Maths support
- General study skills
- i-skills
- Good Academic Practice and writing: paraphrasing, referencing and TurnItIn
- Introduction to Critical Thinking
- Improving your Presentation Skills
- Preparing for your Exam
- Report Writing
- Planning your Dissertation
- Reading and Note-making

In addition, there are drop in support facilities for students to seek help from the Learning Centre Staff. These cover assessment related topics such as:

- exam revision
- planning and writing your academic assignments
- how to use your time efficiently and organise your academic study
- how to take effective notes during lectures
- tips on delivering effective presentations

Employability in the Curriculum:

The following have been identified as important.

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.