Course Specification

A. Course Information			
Final award title(s)	MEng (Hons) Chemical and Energy Engineering		
Intermediate exit award title(s)	CertHE DipHE		
UCAS Code		**Course Code(s)**	5583
	London South Bank University		
School	☐ ASC ☐ ACI ☐ BEA ☐ BUS ☒ ENG ☐ HSC ☐ LSS		
Division	Chemical & Energy Engineering		
Course Director	Dr Anna-Karin Axelsson		
Delivery site(s) for course(s)	☒ Southwark ☐ Havering ☐ Other: please specify		
Mode(s) of delivery	☒Full time ☐Part time ☐other please specify		

Length of course/start and finish dates

Mode	Length years	Start - month	Finish - month
Full time	4/3	September	July
Full time with placement/ sandwich year	5/4	September	July
Part time			
Part time with Placement/ sandwich year			

Is this course generally suitable for students on a Tier 4 visa?	Yes Students are advised that the structure/nature of the course is suitable for those on a Tier 4 visa but other factors will be taken into account before a CAS number is allocated. International Office questionnaire updated	
Approval dates:	Course(s) validated	July 2019
	Course Review date	July 2024
	Course specification last updated and signed off	September 2023

Professional, Statutory & Regulatory Body accreditation	MEng not accredited	
Reference points:	Internal	-Corporate Strategy 2020-2025 -Academic Quality and Enhancement Manual -School Strategy -LSBU Academic Regulations
	External	-QAA Quality Code for Higher Education 2018 -Framework for Higher Education Qualifications (QAA, 2018) -Subject Benchmark Statements: Engineering 2018 -The Accreditation of Higher Education Programmes (AHEP-3 2014) -SEEC Level Descriptors 2021 -Competitions and Markets Authority Guidance

B. Course Aims and Features

Distinctive features of course	The MEng in Chemical and Energy Engineering is distinctive in that it teaches the theory of chemical engineering coupled with computer simulation, laboratory practice and industrial placement that enable graduates to be well equipped with desired skills sought after by employers. This UG programme has the added value of introducing topics that important for the future energy mix with a focus on oil and gas and renewables. In the first year, students are introduced basic engineering design on the base of learning the knowledge of maths and engineering principles. The second year focusses on core unit operations such as fluid flow, thermodynamics, chemical reaction & separation, process simulation and control. After two-years study, the students can opt to having one year industrial placement. Also after second year, the BEng student with >70% receive an offer to transfer to MEng. In the third year of the MEng, the students are trained in advanced topics in process safety and control, environmental protection and clean process technology. The students apply all the knowledge gained in their previous study into project design from raw materials to final desired product. The fourth year, Level 7, takes the student to more energy and process management direction with modules like Process Management, Advanced Energy Technology and a 40 credit Group Project.
Course Aims	The MEng Chemical and Energy Engineering aims to: 1. Produce graduates trained in the core discipline of chemical engineering including energy, materials and reaction engineering, and project management. 2. To produce MEng graduates who are equipped with the relevant understanding, skills and knowledge required to operate effectively in the chemical and energy engineering sector. 3. Produce graduates capable of contributing to the profession of chemical engineering in the context of modern industrial practice and sustainable development. 4. To enable students to develop an understanding of relevant disciplines associated with chemical and energy engineering in order to operate in multidisciplinary teams.

	5. Develop students' knowledge of mathematics, applied sciences, engineering methods and safety, in support of the central themes of the course. 6. Develop students' intellectual and reasoning powers, their ability to perceive the broader perspective, and their problem-solving skills through the integration of a broad range of subject material. 7. Teach students to communicate clearly, to argue rationally and to draw conclusions based on an analytical and critical approach to data and systems. 8. To encourage the development of personal qualities and professional competences of chemical engineers with an emphasis for energy. 9. Develop the transferable skills expected of an honours graduate who will work in multi-disciplinary teams with technical, commercial and management staff in industrial and other occupations.
Course Learning Outcomes	A. Students will have knowledge and understanding of: A1. Mathematics, science and engineering underlying the practice of chemical engineering. A2. The interactions involved in chemical engineering systems and analytical and computational tools to deal with these. A3. The scope of chemical engineering from the molecular to the large scale. A4. The economic, management and statutory requirements involved in the practice of chemical engineering. B. Students will develop their intellectual skills such that they are able to: B1. Use mathematics, science and engineering to support theoretical and practical analysis of process operations. B2. Employ concepts from the applied and engineering sciences creatively to design industrial processes and equipment. B3. Show awareness of the significance of scale-up techniques in design work. B4. Use fundamental knowledge to investigate new and emerging technologies. B5. Extract data pertinent to an unfamiliar problem, and apply in its solution using computer based tools when appropriate. B6. Integrate engineering principles of a multi-disciplinary nature in order to propose solution to problems. B7. Apply management and business practices appropriately. B8. Produce engineering solutions which are consistent with ethical and social responsibilities. C. Students will acquire and develop practical skills such that they are able to: C1. Use computers and current software in quantitative and

	analytical work, as well as general information technology for communication and data handling. C2. Plan and manage work both individually and in teams. Communicate effectively using appropriate media. C3. Evaluate designs and systems to identify areas of potential hazard and environmental threat and propose improvements. C4. Use laboratory, engineering and measuring equipment to provide data in support of theoretical understanding. C5. Analyse and solve engineering problems, often on the basis of limited and imperfect data. Critically apply scientific evidence based methods in the solution of problems. C6 Apply principles of project management. D. Students will acquire and develop transferrable skills such that they are able to: D1. Manipulate, sort and present data in forms useful for understanding. Select, interpret and validate data, identifying possible errors and inconsistencies D2. Communicate clearly the findings of experiments, projects and other assignments using written reports, oral and visual presentations. D3. Work effectively in a team, recognising the roles played by different team members. D4. Manage own responsibilities, including time and task management. D5. Undertake self-development and the capacity to learn. D6. Identify and solve problems in familiar and unfamiliar situations. D7. Adapt to change in the working environment.

C. Teaching and Learning Strategy

A. Lectures, tutorials and laboratory practical cover A1. The behaviour of systems, A2, is introduced in classes at all levels, and is a feature of Design Project (L6) and Group Project work (L7). The two project works also shows the scope of the discipline, A3. Much of the understanding of A4 will be gained in specific modules, mainly at L5, 66 and L7. Statutory requirements, including safety, feature throughout the course, in practical work in particular.
Students are encouraged to attend the seminars/event such as those organised by IChemE. Also, invited speakers will deliver presentations at LSBU on relevant and current topics in chemical engineering.

B. Most of the curriculum will support B1-B8; they are developed through lectures, individual and group problem-based work, including the design project. In private study, students will develop skills by writing laboratory reports, and tackling problems set by the tutor or in past examinations, case studies, and projects.
The intellectual skills developed in computer laboratory sessions embedded in modules and projects will cover B5

C. Computing skills for engineering and science are developed in practical workshops at level L4 and L5. Students also learn the principles and study the application of specialist engineering packages in L6 and L7.
C2 and C3 will be major part of small projects embedded in some modules and in the two project modules (L6, L7) and students will receive guidance on application of

principles studied earlier. C4 will be acquired in practical workshop and laboratory sessions.
The projects (L6, L7), will be open-ended, developing C5 and C6.

D. The transferable skills in D1 are developed in laboratory practical work and design tasks; students for example obtain data from handbooks and computer databases, and use it in calculations, graphical solutions and computer applications throughout the course.
The transferable skills D2 and D3 covering report-writing and team-working skills are developed in laboratory and project-oriented modules throughout the course. D4-D7 are developed along the MEng course.

D. Assessment

A. Summative assessment: Content, knowledge and understanding is assessed through coursework, or coursework and examination. Coursework can take many forms (based on the practical or theoretical content of the module) including essays, reports, group work, oral presentations, production of posters, and in-class tests. Examinations normally take the form of a 2 or 3-hour unseen end-of-semester paper.
Formative assessment includes: tutorials exercises, simulation exercises, discussions in classroom, questions and answer sessions, peer discussions, observations, reflection on learning, presentation rehearsals.

B. Intellectual skills are normally assessed through formal examinations, student presentations and individual viva voce examination. Preparation of laboratory and project reports will also contribute.

C. C1 will be assessed through computing assignments, C2-C6 as parts of the major project assessment, and C4 in the marking of laboratory reports. C5-C6: projects will be marked for a critical approach to problem-solving.

D. A variety of assessment methods are used to assess transferable skills. These include computer laboratory exercises and simulations, oral presentations, written reports, and final project.
For instance: D1 is assessed in many of the written examination papers, also laboratory and project reports. Laboratory teachers give students considerable feedback on the quality of written laboratory reports, D2; students discuss this feedback with their personal tutors. The effectiveness of teamwork, D3, is assessed as an element in the major project.

E. Academic Regulations

1. Assessment regulations

The University's Academic Regulations apply for this course. https://www.lsbu.ac.uk/about-us/policies-regulations-procedures

For course specific protocols please refer to the School of Engineering /Division of Chemical and Energy Engineering protocol document on VLE.

2. Support for students

The University places a high priority on providing support for students. This support is provided by a combination of services, both centrally in the University and locally at the programme level. Much of the support focuses on developing students' skills to enhance their performance on the programme and to facilitate their transition to employment.

2.1 Programme and course level support:

All students are allocated a personal tutor on initial enrolment to the course. The personal tutor is the point of contact for all matters relating to the student's welfare and progress whilst at London South Bank. All tutees will meet their tutor at the start of the course.

The primary teaching contact with students, in classrooms, laboratories and workshop, is supported by print and by electronic material. For their general understanding of the course, students receive a Course Guide and a summary of the syllabus; these are updated annually. For each module, the module leader provides a Module Guide. Subject tutors provide further material as appropriate, including course notes, supporting information and reprints, problem sets, assignment briefs and experiment instructions. Students have access to books in LSBU Hub, and may obtain copies of past exam papers. All guides and support are found on LSBU's Virtual Learning Environment (VLE).

Students on the course benefit from a number of contacts with industry and other outside bodies. A programme of industrial visits will be organised with the aim of introducing students to chemical industries in the UK.

All students are encouraged to take the industrial placement option. Students who complete placements have reported that the experience is invaluable in future employment. Students will find more information on placements via LSBU's Careers Hub

A sandwich placements co-ordinator in Division for Chemical and Energy Engineering will (normally) organise placement information events in-class.

The major projects taken by final year degree students have strong industrial orientation. External speakers from industry are invited to visit during the year to give students an appreciation of industrial technology and practice and, for example, the importance of HAZOP in process industry.

2.2 Student Life Support

The University's Student Life provides a wide range of personal and academic services to students and works with other departments and faculties in the University to ensure that the services offered meet the needs of students. All services, such as accommodation, enrolment practical information are based on 103 Borough Road, the main campus in Southwark. Some services are provided in the evening. Information about all services is included on the website:

https://www.lsbu.ac.uk/student-life

The services on offer include:
Skills for Learning Centre – offers students a range of interactive workshops, one-to-one tutorials and drop-in sessions delivered by experienced learning developers.
The Academic Practice and English Language team provide guidance to maximise your reading, writing and thinking and the Maths and Stats Team deliver tailored support to refresh and improve your numerical, mathematical or statistical knowledge.
https://www.lsbu.ac.uk/student-life/student-services/learning-resources

The Employability Team – helps students to access job opportunities and experience the world of work. The team support students an opportunities to undertake a work placement, internship or other professional experience or study abroad during their degree. The Employability Team deliver free employability workshops for students all year round on a variety of employment related topics.

https://www.lsbu.ac.uk/student-life/student-services/student-employability

Job Shop- is located in the LSBU Student Life Centre and covers a variety of career guidance: Tailoring CVs, cover letters and job applications, one-to-one mock interviews, temporary jobs, placement and internship opportunities and graduate roles. Also supports in sourcing relevant employability related online resources and services.

Personal development and advice – advisory service to discuss personal concerns or difficulties during their programme which might affect their personal development and academic performance, support for students with disabilities including dedicated dyslexia support, chaplaincy to provide confidential pastoral care.

Disability & Dyslexia Support (DDS) https://www.lsbu.ac.uk/student-life/student-services/disability-dyslexia-support

Health and Wellbeing Support https://www.lsbu.ac.uk/student-life/student-services/health-wellbeing

3. Quality indicators

Accreditation will be sought from IChemE/ IOM^3 and Energy Institute (EI) following from previously accredited courses in the area. Previous courses such as the MEng course (three first year in common with BEng) has been accredited by the Institution of Chemical Engineering (IChemE) as meeting the educational requirements for Chartered Engineers at BEng(Hons) level. Accreditation at MEng level will be pursued from the IChemE.

A course board, made up of staff and student representatives from each year of the course, meets at least once per term to discuss issues to do with learning and teaching and course developments. The course board is convened and chaired by the course director.

The course is reviewed at an annual meeting of teaching staff. The review takes into account the progression statistics for the individual modules, students' end of module questionnaires and external examiners' comments. On the basis of these, modifications to modules and the course are proposed and where necessary, submitted to the School Academic Standards Committee for approval.

The course is monitored through the annual monitoring report for Chemical and Energy Engineering.

F. Entry Requirements

In order to be considered for entry to the programme applicants will be required to have:
- A Level AAB or;
- BTEC National Diploma DDD or;

- Access to HE qualifications with 28 Distinctions 24 Merits or;
- Equivalent level 3 qualifications worth 150 UCAS points
- Applicants must hold 5 GCSEs A-C including Maths and English or equivalent (reformed GCSEs grade 4 or above).

Equivalent international qualifications can be accepted. English language qualifications for international students: IELTS score of 6.0 or Cambridge Proficiency or Advanced Grade C.

G. Course structure(s)

Course overview

- MEng (Hons) degree programmes consist of modules with a total credit value of 480 credits; a maximum of 40 credits may be at Level S and a minimal of 120 credits at Level 7.

- The 480 points are made up of 20 standard modules of 20 points each, a project module of 40 points (level 6) and a Group project module of 40 points (level 7). Each year the students need to complete 120 credits.

MEng Chemical and Energy Engineering – Full time

	Semester 1		Semester 2	
Level 4	Engineering Mathematics and Modelling		Engineering Mathematics and Modelling	20
	Design and Practice		Design and Practice	20
	Introduction to Chemical Engineering	20	Computing for Chemical Engineering	20
	Engineering Principles	20	Engineering Principles 2	20
Level 5	Advanced Eng Mathematics and Modelling		Advanced Eng Mathematics and Modelling	20
	Thermodynamics		Thermodynamics	20
	Separation Processes	20	Principles of Control	20
	Chemical Engineering Processes 1	20	Process Design and Simulation	20
Level 6	Design Project		Design Project	40
	Emerging Energy and Sustainability	20	Energy Technologies	20
	Earth Resources	20	Fluid Flow and Process Control	20
Level 7	Group Project		Group Project	40
	Process Management	20	Advanced Energy Technology	20
	Advanced Materials Engineering (OPTIONAL)	20	Subsurface Engineering	20
	Multiphase Fluid Flow (OPTIONAL)	20		

Placements information

Students can take a one-year placement after completing Year 2. When placement vacancies are available, students will be notified by announcements in Moodle. The students are encouraged to find likely industrial placement by any means.

H. Course Modules and Assessment

Module Code	Module Title	Level	Semester	Credit value	Assessment
EEE_4_EMM	Engineering Mathematics and Modelling	4	1 & 2	20	CW & Exam
CEE_4_EP1	Engineering Principles 1	4	1	20	CW & Exam
MED_4_DAP	Design & Practice	4	1 & 2	20	CW
CEE_4_CCE	Computing for Chemical Engineering	4	2	20	CW
CEE_4_ICE	Introduction to Chemical Engineering	4	1	20	CW
CEE_4_EP2	Engineering Principles 2	4	2	20	CW & Exam
MED_5_AMM	Advanced Eng Mathematics and Modelling	5	1 & 2	20	CW & Exam
CEE_5_CP1	Chemical Engineering Processes 1	5	1	20	CW & Exam
CEE_5_SEP	Separation Processes	5	1	20	CW & Exam
CEE_5_TMD	Thermodynamics	5	1 & 2	20	CW & Exam
CEE_5_POC	Principles of Control	5	2	20	CW & Exam
CEE_5_PDS	Process Design and Simulation	5	2	20	CW
CEE_6_DES	Design Project	6	1 & 2	20	CW
CEE_6_ENT	Energy Technologies	6	2	20	CW
CEE_6_FFP	Fluid Flow and Process Control	6	2	20	CW & Exam
CEE_6_ERS	Earth Resources	6	1	20	CW & Exam
CEE_6_EES	Emerging Energy and Sustainability	6	1	20	CW & Exam
CEE_7_GRP	Group Project	7	1 & 2	40	CW
CEE_7_PRM	Process Management	7	1	20	CW & Exam
CEE_7_AME	Advanced Materials Engineering (OPTIONAL)	7	1	20	CW & Exam
CEE_7_MFF	Multiphase Fluid Flow (OPTIONAL)	7	1	20	CW & Exam
CEE_7_AET	Advanced Energy Technology	7	2	20	CW & Exam
CEE_7_SUP	Subsurface Engineering	7	2	20	CW & Exam

I. Timetable information

Students will be able to access a full timetable for the course from the start of semester and will be notified of any changes. Maximum effort is made to leave at least one afternoon/day free from timetable.

J. Costs and financial support

Course related costs

- Although all core books can be found in the library or online as free e-books, the student may wish to buy core reading material for each module. There are also costs associated with printing during the course, which are not covered.

Tuition fees/financial support/accommodation and living costs

Information on tuition fees/financial support can be found by clicking on the following link - http://www.lsbu.ac.uk/courses/undergraduate/fees-and-funding or

- http://www.lsbu.ac.uk/courses/postgraduate/fees-and-funding
- Information on living costs and accommodation can be found by clicking the following link- https://my.lsbu.ac.uk/my/portal/Student-Life-Centre/International-Students/Starting-at-LSBU/#expenses

List of Appendices

Appendix A: Curriculum Map

This map provides a design aid to help course teams identify where course outcomes are being developed, taught and assessed within the course. It also provides a checklist for quality assurance purposes and may be used in validation, accreditation and external examining processes. Making the learning outcomes explicit will also help students to monitor their own learning and development as the course progresses.

Modules			Course outcomes															
Level	**Title**	**Code**	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**D1**	**D2**	**D3**	**D4**
4	Engineering Mathematics and Modelling	ENG_4_401	TDA				TDA								TDA			
4	Engineering Principles 1	CEE_4_EP1	TA				TA						TDA	TA	TDA	TDA	TD	
4	Design & Practice	ENG_4_403		TAD		TD		TDA	TDA	TDA		TDA		TDA	TDA	TDA	TDA	
4	Computing for Chemical and Energy Engineering	CEE_4_CCE	TDA				TDA				TDA				TDA	TDA		
4	Introduction to Chemical and Energy Engineering	CEE_4_ICE	TA		TA		TA	T			TA				TA	TA	TA	
4	Engineering Principles 2	CEE_4_EP2	TA				TA						TDA	TA	TDA	TDA	TDA	
5	Advanced Eng Mathematics and Modelling	ENG_5_410	TDA				TDA				TDA				TDA			
5	Chemical Engineering Processes 1	CEE_5_CP1	TA				TA	TA							TDA	DA		
5	Separation Process	CEE_5_SEP	TA	TDA			TA	TA			TA		TA	TA		TA	TDA	
5	Thermodynamics	CEE_5_TMD	TA	T			TA	TA					TA			TA	TD	
5	Principles of Control	CEE_5_POC	TDA	TDA			TDA	TDA			TDA				TDA	TA		
5	Process Design and Simulation	CEE_PDS		TA	TA	TA	TA	TA	TA		TA		TA	TA		DA		
6	Design Project	CEE_6_DES		DA	DA	DA	DA	DA	DA	DA	D	TDA		DA	DA	DA	DA	D
6	Energy Technologies	CEE_6_ENT				TA				TDA		DA				DA	DA	DA
6	Emerging Energy and Sustainability	CEE_6_EES	TA		TA										DA			
6	Earth Resources	CEE_6_ERS	TDA		TDA	TDA	A	DA	TDA			TDA		TDA		D	D	
6	Fluid Flow and Process Control	CEE_6_FFC	TA	TA			TA	TA			TA			DA		DA		

7	Group Project	CEE_7_GRP		DA	DA	DA	DA	TDA	DA		D	TDA		DA	DA	DA	DA	D
7	Multiphase Fluid Flow	CEE_7_MFF	TA	TA	TAD		TA			TA	TDA							
7	Process Management	CEE_7_PRM	TA		TA							DA	TDA		TA		TDA	
7	Subsurface Engineering	CEE_7_SUB	TA	TAD	TA		TA	TA			TDA							D
7	Advanced Materials Engineering	CEE_7_AME	TA							TA								
7	Advanced Energy Technology	CEE_7_AET	TA	TA		TA	TA	TA			TDA							

Appendix B: Embedding the Educational Framework for Undergraduate Courses

The Educational Framework at London South Bank University is a set of principles for curriculum design and the wider student experience that articulate our commitment to the highest standards of academic knowledge and understanding applied to the challenges of the wider world.

The Educational Framework reflects our status as University of the Year for Graduate Employment awarded by *The Times and The Sunday Times Good University Guide 2018* and builds on our 125 year history as a civic university committed to fostering social mobility through employability and enterprise, enabling our students to translate academic achievement into career success.

There are four key characteristics of LSBU's distinctive approach to the undergraduate curriculum and student experience:

- Develop students' professional and vocational skills through application in industry-standard facilities
- Develop our students' graduate attributes, self-awareness and behaviours aligned to our EPIIC values
- Integrate opportunities for students to develop their confidence, skills and networks into the curriculum
- Foster close relationships with employers, industry, and Professional, Statutory and Regulatory Bodies that underpin our provision (including the opportunity for placements, internships and professional opportunities)

The dimensions of the Educational Framework for curriculum design are:

- **informed by employer and industry** needs as well as professional, statutory and regulatory body requirements
- **embedded learning development** for all students to scaffold their learning through the curriculum taking into account the specific writing and thinking requirements of the discipline/profession
- **high impact pedagogies** that enable the development of student professional and vocational learning through application in industry-standard or authentic workplace contexts
- **inclusive teaching, learning and assessment** that enables all students to access and engage the course
- **assessment *for* learning** that provides timely and formative feedback

All courses should be designed to support these five dimensions of the Educational Framework. Successful embedding of the Educational Framework requires a systematic approach to course design and delivery that conceptualises the student experience of the curriculum as a whole rather than at modular level and promotes the progressive development of understanding over the entire course. It also builds on a well-established evidence base across the sector for the pedagogic and assessment experiences that contribute to high quality learning.

This appendix to the course specification document enables course teams to evidence how their courses meet minimum expectations, at what level where appropriate, as the basis for embedding the Educational Framework in all undergraduate provision at LSBU.

Dimension of the Educational Framework	Minimum expectations and rationale	How this is achieved in the course
Curricula informed by employer and industry need	Outcomes focus and professional/employer links All LSBU courses will evidence the involvement of external stakeholders in the curriculum design process as well as plan for the participation of employers and/or alumni through guest lectures or Q&A sessions, employer panels, employer-generated case studies or other input of expertise into the delivery of the course provide students with access to current workplace examples and role models. Students should have access to employers and/or alumni in at least one module at level 4.	Design & Practice, links with IChemE, Employability Days, BCECA industrial days
Embedded learning development	Support for transition and academic preparedness At least two modules at level 4 should include embedded learning development in the curriculum to support student understanding of, and familiarity with, disciplinary ways of thinking and practising (e.g. analytical thinking, academic writing, critical reading, reflection). Where possible, learning development will be normally integrated into content modules rather than as standalone modules. Other level 4 modules should reference and reinforce the learning development to aid in the transfer of learning.	Design & Practice, Introduction to Chemical Engineering
High impact pedagogies	Group-based learning experiences The capacity to work effectively in teams enhances learning through working with peers and develops student outcomes, including communication, networking and respect for diversity of perspectives relevant to **professionalism** and **inclusivity**. At least one module at level 4 should include an opportunity for group	Design & Practice, Design Project, MEng Group Project

	working. Group-based learning can also be linked to assessment at level 4 if appropriate. Consideration should be given to how students are allocated to groups to foster experience of diverse perspectives and values.	
Inclusive teaching, learning and assessment	<u>Accessible materials, resources and activities</u> All course materials and resources, including course guides, PowerPoint presentations, handouts and Moodle should be provided in an accessible format. For example, font type and size, layout and colour as well as captioning or transcripts for audio-visual materials. Consideration should also be given to accessibility and the availability of alternative formats for reading lists.	All course related material is provided through Moodle and LSBU Hub
Assessment *for* learning	<u>Assessment and feedback to support attainment, progression and retention</u> Assessment is recognised as a critical point for at risk students as well as integral to the learning of all students. Formative feedback is essential during transition into university. All first semester modules at level 4 should include a formative or low-stakes summative assessment (e.g. low weighted in final outcome for the module) to provide an early opportunity for students to check progress and receive prompt and useable feedback that can feed-forward into future learning and assessment. Assessment and feedback communicates high expectations and develops a commitment to **excellence**.	All level 4 Modules
High impact pedagogies	<u>Research and enquiry experiences</u> Opportunities for students to undertake small-scale independent enquiry enable students to understand how knowledge is generated and tested in the discipline as well as prepare them to engage in enquiry as a highly sought after outcome of university study. In preparation for an undergraduate dissertation at level 6, courses should provide opportunities for students to	Design & Practice, Introduction to Chemical Engineering, Design Project, MEng Group Project

	develop research skills at level 4 and 5 and should engage with open-ended problems with appropriate support. Research opportunities should build student autonomy and are likely to encourage **creativity** and problem-solving. Dissemination of student research outcomes, for example via posters, presentations and reports with peer review, should also be considered.	
Curricula informed by employer and industry need / Assessment *for* learning	<u>Authentic learning and assessment tasks</u> Live briefs, projects or equivalent authentic workplace learning experiences and/or assessments enable students, for example, to engage with external clients, develop their understanding through situated and experiential learning in real or simulated workplace contexts and deliver outputs to an agreed specification and deadline. Engagement with live briefs creates the opportunity for the development of student outcomes including **excellence**, **professionalism**, **integrity** and **creativity**. A live brief is likely to develop research and enquiry skills and can be linked to assessment if appropriate.	Design & Practice, links with IChemE
Inclusive teaching, learning and assessment	<u>Course content and teaching methods acknowledge the diversity of the student cohort</u> An inclusive curriculum incorporates images, examples, case studies and other resources from a broad range of cultural and social views reflecting diversity of the student cohort in terms of, for example, gender, ethnicity, sexuality, religious belief, socio-economic background etc. This commitment to **inclusivity** enables students to recognise themselves and their experiences in the curriculum as well as foster understanding of other viewpoints and identities.	Diversity and inclusivity is acknowledged throughout all modules
Curricula informed by	<u>Work-based learning</u> Opportunities for learning that is relevant to future employment or	Placement Year

employer and industry need	undertaken in a workplace setting are fundamental to developing student applied knowledge as well as developing work-relevant student outcomes such as networking, **professionalism** and **integrity**. Work-based learning can take the form of work experience, internships or placements as well as, for example, case studies, simulations and role-play in industry-standards settings as relevant to the course. Work-based learning can be linked to assessment if appropriate.	
Embedded learning development	<u>Writing in the disciplines: Alternative formats</u> The development of student awareness, understanding and mastery of the specific thinking and communication practices in the discipline is fundamental to applied subject knowledge. This involves explicitly defining the features of disciplinary thinking and practices, finding opportunities to scaffold student attempts to adopt these ways of thinking and practising and providing opportunities to receive formative feedback on this. A writing in the disciplines approach recognises that writing is not a discrete representation of knowledge but integral to the process of knowing and understanding in the discipline. It is expected that assessment utilises formats that are recognisable and applicable to those working in the profession. For example, project report, presentation, poster, lab or field report, journal or professional article, position paper, case report, handbook, exhibition guide.	Design & Practice, Introduction to Chemical Engineering, Engineering Principles, Separation Processes, Thermodynamics, Chemical Engineering Process 1, Design Project, MEng Group Project
High impact pedagogies	<u>Multi-disciplinary, interdisciplinary or interprofessional group-based learning experiences</u> Building on experience of group working at level 4, at level 5 students should be provided with the opportunity to work and manage more complex	Design & Practice

	tasks in groups that work across traditional disciplinary and professional boundaries and reflecting interprofessional work-place settings. Learning in multi- or interdisciplinary groups creates the opportunity for the development of student outcomes including **inclusivity**, communication and networking.	
Assessment *for* learning	<u>Variation of assessment</u> An inclusive approach to curriculum recognises diversity and seeks to create a learning environment that enables equal opportunities for learning for all students and does not give those with a particular prior qualification (e.g. A-level or BTEC) an advantage or disadvantage. An holistic assessment strategy should provide opportunities for all students to be able to demonstrate achievement of learning outcomes in different ways throughout the course. This may be by offering alternate assessment tasks at the same assessment point, for example either a written or oral assessment, or by offering a range of different assessment tasks across the curriculum.	Variation in assessment is provided throughout all modules
Curricula informed by employer and industry need	<u>Career management skills</u> Courses should provide support for the development of career management skills that enable student to be familiar with and understand relevant industries or professions, be able to build on work-related learning opportunities, understand the role of self-appraisal and planning for lifelong learning in career development, develop resilience and manage the career building process. This should be designed to inform the development of **excellence** and **professionalism**.	Links with the IChemE, Employability Days
Curricula informed by employer and industry need / Assessment *for* learning /	<u>Capstone project/dissertation</u> The level 6 project or dissertation is a critical point for the integration and synthesis of knowledge and skills from across the course. It also provides an important transition into employment if the assessment is authentic, industry-facing or client-driven. It is	Design Project, MEng Group Project

High impact pedagogies	recommended that this is a capstone experience, bringing together all learning across the course and creates the opportunity for the development of student outcomes including **professionalism**, **integrity** and **creativity**.	

Appendix C: Personal Development Planning

Personal Development Planning (PDP) is a structured process by which an individual reflects upon their own learning, performance and/or achievement and identifies ways in which they might improve themselves academically and more broadly. Course teams are asked to indicate where/how in the course/across the modules this process is supported.

Approach to PDP	Level 1	Level 2	Level 3	Level M
1 Supporting the development and recognition of skills through the personal tutor system.	Personal Tutor scheme embedded in Design & Practice module	Continuation of personal tutor	Continuation of personal tutor	Continuation of personal tutor
2 Supporting the development and recognition of skills in academic modules/modules.	Design & Practice module	Laboratory and computer based modules	Design Project	Group Project
3 Supporting the development and recognition of skills through purpose designed modules/modules.	Design & Practice module	Laboratory and computer based modules	Design Project	Group Project
4 Supporting the development and recognition of skills through research projects and dissertations work.	Design & Practice	Chemical engineering Process 1	Design Project Research.	Group Project research
5 Supporting the development and recognition of career management skills.	Introduction to Chemical Engineering	Process safety & Environment Protection	Design Project Energy Technologies	Group Project.
6 Supporting the development and recognition of career management skills through work placements or work experience.				Group Project
7 Supporting the development of skills by recognising that they can be developed through extra curricula activities.		Industrial events	IChemE Seminars attendance.	

8 Supporting the development of the skills and attitudes as a basis for continuing professional development.			Design Project, IChemE Seminars	Group Project.
9 Other approaches to personal development planning.			Design Project	
10 The means by which self-reflection, evaluation and planned development is supported e.g. electronic or paper-based learning log or diary.	Design & Practice		Design Project	Group Project

Appendix D: Terminology

[Please provide a selection of definitions according to your own course and context to help prospective students who may not be familiar with terms used in higher education. Some examples are listed below]

awarding body	a UK higher education provider (typically a university) with the power to award higher education qualifications such as degrees
bursary	a financial award made to students to support their studies; sometimes used interchangeably with 'scholarship'
collaborative provision	a formal arrangement between a degree-awarding body and a partner organisation, allowing for the latter to provide higher education on behalf of the former
compulsory module	a module that students are required to take
contact hours	the time allocated to direct contact between a student and a member of staff through, for example, timetabled lectures, seminars and tutorials
coursework	student work that contributes towards the final result but is not assessed by written examination
current students	students enrolled on a course who have not yet completed their studies or been awarded their qualification
delivery organisation	an organisation that delivers learning opportunities on behalf of a degree-awarding body

distance-learning course	a course of study that does not involve face-to-face contact between students and tutors
extracurricular	activities undertaken by students outside their studies
feedback (on assessment)	advice to students following their completion of a piece of assessed or examined work
formative assessment	a type of assessment designed to help students learn more effectively, to progress in their studies and to prepare for summative assessment; formative assessment does not contribute to the final mark, grade or class of degree awarded to students

higher education provider	organisations that deliver higher education
independent learning	learning that occurs outside the classroom that might include preparation for scheduled sessions, follow-up work, wider reading or practice, completion of assessment tasks, or revision
intensity of study	the time taken to complete a part-time course compared to the equivalent full-time version: for example, half-time study would equate to 0.5 intensity of study
lecture	a presentation or talk on a particular topic; in general lectures involve larger groups of students than seminars and tutorials
learning zone	a flexible student space that supports independent and social earning
material information	information students need to make an informed decision, such as about what and where to study
mode of study	different ways of studying, such as full-time, part-time, e-learning or work-based learning
modular course	a course delivered using modules
module	a self-contained, formally structured unit of study, with a coherent and explicit set of learning outcomes and assessment criteria; some providers use the word 'course' or 'course unit' to refer to individual modules
national teaching fellowship	a national award for individuals who have made an outstanding impact on student learning and the teaching profession
navigability (of websites)	the ease with which users can obtain the information they require from a website
optional module	a module or course unit that students choose to take
performance (examinations)	a type of examination used in performance-based subjects such as drama and music
professional body	an organisation that oversees the activities of a particular profession and represents the interests of its members
prospective student	those applying or considering applying for any programme, at any level and employing any mode of study, with a higher education provider

regulated course	a course that is regulated by a regulatory body
regulatory body	an organisation recognised by government as being responsible for the regulation or approval of a particular range of issues and activities
scholarship	a type of bursary that recognises academic achievement and potential, and which is sometimes used interchangeably with 'bursary'
semester	either of the parts of an academic year that is divided into two for purposes of teaching and assessment (in contrast to division into terms)
seminar	seminars generally involve smaller numbers than lectures and enable students to engage in discussion of a particular topic and/or to explore it in more detail than might be covered in a lecture
summative assessment	formal assessment of students' work, contributing to the final result
term	any of the parts of an academic year that is divided into three or more for purposes of teaching and assessment (in contrast to division into semesters)
total study time	the total time required to study a module, unit or course, including all class contact, independent learning, revision and assessment
tutorial	one-to-one or small group supervision, feedback or detailed discussion on a particular topic or project
work/study placement	a planned period of experience outside the institution (for example, in a workplace or at another higher education institution) to help students develop particular skills, knowledge or understanding as part of their course
workload	see 'total study time'
written examination	a question or set of questions relating to a particular area of study to which candidates write answers usually (but not always) under timed conditions