

Course Handbook

BEng (Hons) Building Services and Sustainable Engineering
MEng (Hons) Building Services and Sustainable Engineering
2019 – 20

Course Leader: Hilal Kabbara

School of Engineering, Preston Campus, and
Vocational Training Council (VTC) in Hong Kong (BEng Year 3 only)



Please read this Handbook in conjunction with the University's Student Handbook.

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1. Introduction to the course

1.1 Welcome to the course

People spend the major part of their lives inside buildings which provide them with an environment that is comfortable and commensurate for intended activities. While the weather may fluctuate to the extreme limits of high and low climatic conditions, the building indoor, albeit at the expense of energy, is kept within comfortable thermal, aural and visual conditions. It is estimated that forty per cent of a nation's energy expenditure takes place in keeping the indoor condition healthy, comfortable, safe and productive. The relentless pursuit for better lives has not been without the risk of losing bearing. In recent years the detection of global warming trend and the realisation that the fossil fuels, the traditional sources of energy, have been depleting at very fast rates, have posed mankind to the challenge of the era that the civilisation has to consider sustainability issues seriously. Nowadays engineers have been working closely with Architects to design a healthy and comfortable indoor environment and tackle the issues associated with energy usage and its conservation. The challenge of the era entails him/her to be a Building Services Engineer who applies both knowledge and skills to ensure that his/her engineering solutions lead to a sustainable design.

So, I greet you with the warmest welcome to the course of BEng/MEng (Hons) Building Services and Sustainable Engineering, including foundation entry, that will educate you to meet the new challenges of the millennium as a conscientious, imaginative and innovative engineer.

1.2 Rationale, aims and learning outcomes of the course



The programme leads to the award of Bachelor or Master of Engineering (with Honours) in Building Services and Sustainable Engineering. The level of education provided by the programme is appropriate to those students who will eventually hold senior positions with consultants or contractors engaged in the Building Services Engineering and Energy Management or with technical departments of government and semi-government institutions where building energy management is a major concern. Throughout the programme emphasis will be placed on self-motivation, critical thinking and developing analytical depth.

The BEng/MEng (Hons) Building Services and Sustainable Engineering course, including foundation entry, emphasises the application of modern, sustainable and energy efficient engineering systems in the context of the built environment. The course is designed upon the existing BEng (Hons) Building Services and Sustainable Engineering, which have been well-recognised in the industries in the UK and abroad for more than 30 years and accredited by the Chartered Institution of Building Services Engineers (CIBSE) and Energy Institute (EI). The MEng course will continue to be accredited by CIBSE.

The application of sustainable Building Services Engineering is multi-disciplinary, and it is envisaged that, as in the professional world, you will carry out project work, which will facilitate dialogue between the engineers and other members of the design and management team. It is the development of novel technological and engineering solutions within the often contradictory constraints of sustainability, safety, economy and energy efficiency, and the law which pose the challenge in the course.

In the past, Building Services Engineering education often centred on practical engineering analysis and training, however this focus is now changing in the light of the requirements for sustainability and energy efficiency in all that we do. This course will promote the need to question accepted wisdom to provoke independent critical thought. In a time of rapid technological advances, when the international community is aware of and sensitive to a range of environmental issues, you will gain sufficient understanding of current developments and their underpinning technology to analyse and offer solutions to the problems faced by today's engineers in the fields of architecture and associated engineering disciplines.

As a result you will find that the programme is now characterised by parallel themes of design and management of project work, complemented throughout by the drive towards sustainability and energy efficiency of engineering solutions. The management theme will develop your capabilities as a project manager, whilst the project modules will provide scope for integrative studies on practical engineering and design situations.

The full program specifications, including learning outcomes, are provided as appendices.

The course **aims**:

- To provide students with a suitable basis in the fundamentals and principles of Building Services and Sustainable Engineering to cope with the future developments during the student's career. This will allow the student to develop knowledge and understanding to maintain and manage applications of current and developing technology in sustainable building services design, construction, control and operations. Thereby affording graduates the opportunity to fulfil the educational requirements to become full Chartered Building Services Engineer.
- To meet the requirement for full registration with the Engineering Council as a CEng (Chartered Engineer)
- To enable students to undertake independent critical thought and analysis, enhancing and extending their intellectual development whilst becoming conversant with the nature of the industry, thereby developing the ability to achieve optimal solutions to modern building requirements and complex engineering problems.
- To encourage students to approach their academic and subsequent professional careers as creative and innovative individuals.
- To ensure that successful graduates will have the potential to contribute to significant advances in building design and engineering disciplines associated with their industry of choice.

1.3 Course Team

The management of the programmes in the School and the evaluation of the effectiveness of the management process take place within the mechanism established for that purpose by the University through the School's Management and the Committee Structures. This is achieved at course level by a course team. The function of the Course Team is to administer the programme within the regulations and policies laid down by the University, taking such tactical decisions as are necessary to ensure the maximum effectiveness of the programme.

For any enquiry on the course, the contact person is the Course Leader: Hilal Kabbara e-mail: hkabbara@uclan.ac.uk, Tel: 01772 894206. The course is delivered by the course team

comprising the Course Leader, Module Tutors, Dissertation tutor and industrial experience tutor. Admission enquiries can be made to the Course Leader.

The course draws and assimilates the expertise from academic staff linked to all academic units of the school. A core group of staff, whose contact details are given in the table below, form Building Services and Sustainable Engineering group in the school. A core group of staff, whose contact details are given in the table below (Table 1):

Table 1: Specialised Academic Staff

Name	Qualifications & Designations	Role	Email (user@uclan.ac.uk) Telephone number
Dr Jiang, Liben	PhD, MEng, BEng, FHEA	Senior Lecturer Course Leader	ljiang2 01772 89 5789
Dr Parr, Eric	PhD, CEng BEng (Hons), MCIBSE	Lecturer	eparr1 01772 89 3205
Kabbara, Hilal	MSc, BSc, CEng, MCIBSE, FSOE, FHEA	Senior Lecturer, Course Leader	hkabbara 01772 89 4206
Tabrizi, Darius	BEng (Hons), FHEA, CEng, MCIBSE	Senior Lecturer, Course Leader	dtabrizi 01772 89 4223

Hilal Kabbara (BEng course Leader) is a Chartered Building Services Engineer who has been involved in the Industry and Academia for over three decades. He holds a first degree in Mechanical Engineering, an MSc in Building Services Engineering, a Post-graduate Diploma in Environmental Engineering and a Certificate in Education. He is a full Member of the Chartered Institution of Building Services Engineers and a Fellow of the Society of Operations Engineers and fellowship of the Higher Education Academy. He had spent many years in Design Consultancy and Project Management before he joined Academia. He taught over the years a wide range of Mechanical and Electrical Services subjects in both UK and Overseas. His experience in both Industry and Academia has contributed significantly to the improvement and development of the Building Services courses since he joined the University. He is involved in Knowledge Transfer with other Units in the School and contributes to the Architecture, Building surveying and Quantity surveying Courses.

Dr Liben Jiang is a Senior Lecturer who has had an intensive research experiences for more than 15 years in the building/energy related subjects. His research interests lie in the fields of thermoelectric cooling, solar thermal/PV applications, heat recovery systems, and refrigeration. Currently he is developing a project in thermoelectric power generation. He holds a BEng (Hons) in Chemical Machinery and Equipment and a Master's degree and a PhD. He is also a Fellow of the Higher Education Academy. Since he joined the University Dr Jiang has been focusing on both teaching and research activities in building services engineering and energy associated with it. He also delivers several modules and supervises students at both undergraduate and postgraduate levels including PhD supervision. He is proactively developing international cooperation, such as overseas course development and collaborative research work, with Chinese and Malaysian universities. He also contributes his knowledge to a couple of the knowledge transfer projects within the University.

Dr Eric Parr is a Chartered Engineer who holds a BEng (Hons) in Building Services Engineering and a PhD from the University of Central Lancashire. Dr Eric has a significant experience in both Academia and Industry. He had spent about 20 years in Industry as an Environmental Engineer prior to studying for his BEng (Hons) and PhD. He taught a wide range of engineering subjects since graduation.

Darius Tabrizi is a Chartered Engineer who holds a BEng (Hons) in Building Services Engineering. He is a full member the Chartered Institution of Building Services Engineers. He has been involved in the Industry and Academia for the past 25 years. He is the course leader of MSc in Building Services. His main expertise is design, implementation and operation of low carbon based and sustainable energy supplies through the Management of Mechanical and Electrical Engineering (M&E) design team and the management and delivery of planned preventative maintenance. He is responsible for the delivery of design projects at level 5 and 6 as well as the supervision of students' dissertations.

1.4 Academic Advisor

You will be assigned an Academic Advisor who will provide additional academic support during the year. They will be the first point of call for many of the questions that you might have during the year. Your Academic Advisor will be able to help you with personal development, including developing skills in self-awareness, reflection and action planning.

Please write the name of your academic advisor in the box provided below.

My Academic Advisor is:



1.5 Administration details

Course Administration Service provides academic administration support for students and staff and are in the following hubs which open from 8.45am until 5.15pm Monday to Thursday and until 4.00pm on Fridays. The hub can provide general assistance and advice regarding specific processes such as extenuating circumstances, extensions and appeals.

Allen Building

Medicine
Dentistry
telephone: 01772 895566
email: AllenHub@uclan.ac.uk

Harris Building

Lancashire Law School
Humanities and the Social Sciences
Centre for Excellence in Learning and Teaching
telephone: 01772 891996/891997
email: HarrisHub@uclan.ac.uk

Foster Building

Forensic and Applied Sciences
Pharmacy and Biomedical Sciences
Psychology
Physical Sciences
telephone: 01772 891990/891991
email: FosterHub@uclan.ac.uk

Computing and Technology Building

Art, Design and Fashion
Computing
Journalism, Media and Performance
Engineering
telephone: 01772 891994/891995
email: CandTHub@uclan.ac.uk

Greenbank Building

Sport and Wellbeing
Management
Business
telephone: 01772 891992/891993
email: GreenbankHub@uclan.ac.uk

Brook Building

Community, Health and Midwifery
Nursing
Health Sciences
Social Work, Care and Community
telephone: 01772 891992/891993
email: BrookHub@uclan.ac.uk

1.6 Communication



The University expects you to use your UCLan email address and check regularly for messages from staff. If you send us email messages from other addresses, they risk being filtered out as potential spam and discarded unread.

Staff normally use e-mail or e-learn facilities such as blackboard or notice boards to communicate with students. In some cases a telephone can be used as a communication means. Students are advised to communicate with staff during working hours (9:00 AM to 5:00 PM). Appointments must be made by e-mail as well.

1.6 External Examiner

The University has appointed an External Examiner to your course who helps to ensure that the standards of your course are comparable to those provided at other higher education institutions in the UK. The name of this person, their position and home institution can be found below.

External examiner: is **Dr Mostafa Darwish**, Faculty of Computing, Engineering and Science, University of South Wales.

The External Examiners reports for Engineering course can be accessed electronically via the Engineering@UCLan on Blackboard pages.



2. Structure of the course

2.1 Overall structure

There is a foundation entry route available for student prior to beginning this course. The Programme Specification for the Foundation Entry Route is available in section 8 of this handbook.

The course provides modules at level 4 to 6 of academic curriculum. For a successful completion of the course, BEng students must pass 360 credits worth of modules of which 120 credits must be at level 6. MEng students, however, must pass 480 credits worth of modules, of which 120 at Level 7. NT3048 Engineering Dissertation is compulsory for those students who wish to take the exit award as BEng; while for those who are aiming for final MEng, this module is NOT allowed to be taken in Year 3 (Full-Time). Students must pass all compulsory modules and several optional modules to meet the course requirement.

Full time BEng and MEng students will complete the degree in three years and four years of study respectively, although an optional industrial placement module between years 2 and 3 is available to students wishing to study in sandwich mode.

In part time mode, the programme is designed to operate over five years for BEng and 6 years for MEng, but as students usually enter the programme with an HNC or equivalent and enough years of experience, they would normally be exempt from year 1 of the programme of the part-time programme. Typically, therefore, BEng part-time students will complete years 2 to 5 and MEng students will complete years 2 to 6 of the programme.

The route of Foundation Entry offers students with lower academic background but high interests in the subject a great opportunity to get into the appropriate course and start to build up the necessary and fundamental knowledge. After successful completion of Year 1 study, they can automatically progress to the standard BEng/MEng (Hons) course.

2.1.1 Optional modules

The course programme includes several optional modules at level 6 so that the successful candidate receives an appropriate engineering education that will help him to obtain credits towards his professional qualification.

2.1.2 Accreditation of Prior Learning

For candidates entering with a suitable HNC and/or appropriate experience, Accreditation of Prior Learning (APL) will normally be offered 60 credits. This mode of accreditation accounts for year 1 of the 5-year part-time programme. Such candidates must complete a total of 300 credits including 120 credits at level 6 to graduate.

Students with a first degree or HND, considered to be in an appropriate discipline with relevant experience by the Course Leader, may be offered APL on several further modules. No APL will be offered on Level 6 modules.

2.2 Modules available

Various modules for standard MEng/BEng (Hons) courses which the students are required to take at different years of their studies are given in tables 2 and 3.

2.2.1 Module Registration Options

Discussions about your progression through the course normally take place in February each year. It is an opportunity for you to make plans for your study over the next academic year. The course team will tell you about the various modules available and you will both agree on the most appropriate (and legal) course of study for you.

Any queries and/or concerns regarding your progression should be addressed and discussed with your personal tutor and ultimately with the course leader.

2.3 Study Time

2.3.1 Weekly timetable

The weekly time tables will be made available to the students prior to the commencement of the academic year. You are strongly suggested to check it online every week.

2.3.2 Hours of Study

The normal amount of work involved in achieving a successful outcome to your studies is to study for 10 hours per each credit you need to achieve – this includes attendance at UCLan and time spent in private study.

The expected hours a student will be spending depends on their background. A general guidance regarding the hours of involvement including the self-study time has been given in the School Handbook.

2.3.2.1 Attendance Requirements

You are required to attend all timetabled learning activities for each module. Notification of illness or exceptional requests for leave of absence must be made to the Personal Tutor, Module Tutor(s) or Course Leader.

For international students, under the Points-Based System (PBS) by UK Border Agency (UKBA), you **MUST** attend your course of study regularly. UCLan is a Highly Trusted Sponsor and has a UKBA Sponsor Licence. University is obliged to tell UKBA if you withdraw from a course, defer or suspend your studies, or if you fail to attend the course regularly.

If you have not gained the required authorisation for leave of absence, do not respond to communications from the University and if you are absent for four weeks or more, you may be deemed to have withdrawn from the course. If this is the case, then the date of withdrawal will be recorded as the last day of attendance.

You are being monitored through SAM system so you can check your attendance record through student portal.

3. Approaches to teaching and learning

3.1 Learning and teaching methods

Methods are of a varied nature. They consist of a range of design based exercises, lectures and tutorials to ensure Knowledge and understanding are achieved. As well as those, at levels 4 and 5, project based assignments and examination papers based upon problem solving techniques are used.

At Levels 6 & 7 the use of the design project and dissertation modules which focus upon individual study and group based activities enables students to show a critical awareness of the significance and scope of their chosen discipline, particularly its contribution to the built environment and to society. The importance of the design project modules which run throughout the programme is emphasised in evaluating the appropriateness of different approaches to solving problems related to Building Services Engineering. It also initiate, devise and develop a working personal and professional development plan by participation on the course programme, completing the necessary key skills and working with tutors within a structured and managed learning environment. This will ensure Specific Skills are achieved.

The teaching style undertaken in classes at Levels 6 & 7 will be interactive; do not expect to be provided with every single part of knowledge required. This programme is centred upon yourself as a Master of knowledge and information. It is wise to ensure that you are well equipped to participate in the classes undertaken.

The use of design based modules which involve individual and team based design activities is achieved primarily by setting scenario based assignments and examination papers to meet thinking skills. An investigative approach in learning can be achieved at levels 5, 6 & 7 as well.

We encourage the student to complete the review of their class notes and aspects of learning after a class teaching session. This can be done by writing up, reading and investigating issues covered. We also encourage the student to use the e-Learning facilities where available to develop your approaches to the study. Students will find that many of the course modules are designed to receive their thoughts and reflections on this process as the course progresses.

It is recommended that the students maintain contact and dialogue with their personal tutor to aid their progression, and make sure of the effective use of the communications systems provided, particularly via BLACKBOARD to develop their input into the programme.

It is worth considering the following summary of issues with respect to aiding students approach to teaching and learning:

- Read your module information carefully
- Use the reading list to develop your knowledge and interaction with the subject area
- Use the online e-Learning to aid your learning (via Blackboard)
- Communicate with your personal tutor
- Ensure that you review your own work progress throughout the module

The learning skills facility is an excellent aid to the students learning this can be accessed via the course web area on the BLACKBOARD electronic resource of UCLan.

3.1.1 Modes of Study

The programme of study will be available in the full time, full time sandwich and part time attendance modes.

Part time students normally attend classes on one day per week, 9.00 am – 6.00pm, although attendance to 8.00 pm may be required in one or two semesters.

Full time students will be normally timetabled on the basis of 4 study days with classes operating from 9.00 am to 5.00 pm, although one evening attendance to 8.00 pm may be required.

3.1.2 Part time study

The Part Time route is an alternative method of study to the full time/sandwich mode. There are people in employment who could benefit from this course, and who may not be able to study on a full time basis. There are other people working in related occupations who may

like to study such a course, as part of their personal professional development, but again they may only be able to do so, on a part time basis. The part time route has been designed to make the BEng (Hons) accessible to all of these people.

3.1.3 Sandwich Mode

Full time students can choose to study the course in three years of full time study or they can opt to include a year-long sandwich placement in order to gain industrial experience in order to develop their work profile and aid career opportunities. The contribution of this experience to the learning process is invaluable and many students have noted the benefits derived in contribution to the final level of their studies.

All sandwich students will be expected to undertake a minimum of 48 weeks work experience in industry. This is defined in module BN2830.

As a result of such experience, you will be better equipped to recognise the wide range of skills required and thus be able to judge the professional role to which you may aspire after graduation.

The period of work experience may be obtained by attending a full time period of employment after completing Level 5 of the course. Alternatively you may attend employment on a full time basis subject to day release, for the part time route. This does not qualify you for a sandwich degree, however.

The Industrial Experience Tutor will co-ordinate the task of preparing and placing sandwich degree students in employment. Normally the Department will find the industrial placement(s), but it is ultimately your responsibility to find appropriate employment if you wish to take the sandwich route. Often employers will forward details of placement(s) and advertisement will be posted on the Course Notice Board. The process of appointment will be made on the basis of CV competition and the following interview.

The University cannot guarantee to find placements for students. Sandwich students must liaise with the Industrial Experience Tutor. This is normally the Course Leader.

University staff will advise on suitable placements and will visit students at their place of work. In the middle of industrial experience a seminar will be organised in the University to review progress. You will be assessed through coursework. Students whose work experience has been assessed as satisfactory can either be awarded a pass or a distinction for the sandwich year.

3.1.4 Workshops

One week workshops are included in each of years 2 – 5 of the part time mode but are also available to those students on alternative modes of study. The workshops allow the students to work individually or in groups on a variety of themes designed to complement the regular course material and in a manner not normally available to part-time students. These workshops form part of the Assignment package for the course.

In particular, the workshops are a good vehicle to:

- encourage students to think with originality and develop self confidence

- foster a group spirit among the students (and staff)
- develop good staff/student relations
- enable students to carry out more extensive pieces of work than is normally possible on a part-time course. If students are unable to attend a workshop then alternative arrangements are made with them on an individual basis. Workshops are residential and each year takes an overall theme.

Year 1 (year 2 part-time)

This workshop is designed to confront the student with real engineering problems, challenge them to derive intelligent solutions and encourage them to articulate those solutions and present them with confidence to a wider audience.

The workshop is based in a hotel and conference centre. Each student will work on a series of assignments through the week. They will be required to investigate and present reports ready to give to the Hotel Management on a range of aspects of Building Services and environmental conditions.

University staff, and in some cases Hotel Management, will act as clients, giving the brief to the students.

In some cases these reports may be suitable for presentation to the Hotel Management. Students will work within time constraints to complete their assignments.

The cost is currently £500. Students are required to provide this amount to participate in this residential workshop. Students will be invoiced by the University.

Year 2 (years 3, 4 & 5 part-time)

Every year since 1989 these two workshops have taken place outside of the UK. We have worked with the Technical University in Copenhagen, the Augsburg Fachhochschule in Bavaria and private and public companies in Germany, Switzerland, France and Hong Kong. During these visits our objectives have generally been to:

- study German/Danish/French organisational techniques applied to the procurement of building services installations;
- allow student to compare and contrast current practice in a European context;
- work and interact with student from mainland European countries.

In January 1997 we took a group to the USA. Our main objective was to attend the ASHRAE Conference in Philadelphia and to allow students exposure to American practice and research. We stayed in New York and with the help of the New York Chapter of ASHRAE visited and met with engineering staff responsible for many famous buildings, among them the U.N., the World Trade Centre and Grand Central Station. In January 1998 our workshop was in San Francisco at the ASHRAE conference and at the campus of Berkeley University. In January 1999 we visited the ASHRAE conference in Chicago. As a result of these visits the student body now has a branch (chapter) of this American Engineering society in the University (only the second such group in the UK). February 2000 saw the building services engineers at ASHRAE in Dallas Texas. This workshop is now a regular feature of the programme with successive visits made to the ASHRAE conference. We have continued with similar visits up to the present time.

The cost of this residential workshop is currently £990. Students are required to provide this amount to participate in this residential workshop. Students will be invoiced by the Univeristy. **Year 3 & 4 (year 5 & 6 part-time)**

Final year workshops have, since 1994, attended the CIBSE National Conference. In conjunction with staff, graduates from the degree have presented refereed conference papers based on their dissertation topics.

All of the above are intended to encourage teaching and research links to overlap on this programme. The acceptance of papers from undergraduates for a refereed conference shows that this aim is being matched by reality.

In the February 2007, 2008, 2009 and 2010 workshops, we afforded final year (4th year part-time) students the opportunity to attend a Building Services Engineering student conference in Hong Kong, where peer-reviewed papers were delivered by UK and Hong Kong students. This was held in conjunction with CityEdu, a higher education consultancy, to whom UCLan's under- and post-graduate Building Services courses are franchised. This event is now likely to be repeated annually in collaboration with our partner VTC in Hong Kong. The cost is currently £990. Students are required to provide this amount to participate in this residential workshop. Students will be invoiced by the Univeristy.

Expected workshop programme:

- 2nd year part-time, 1st year full-time: Location: Lytham St Anne's. Cost £550
- 3rd & 5th years part-time, 2nd year full-time: ASHRAE Winter Conference. Cost £990
- 4th year part time, 3rd year full-time: UCLan VTC Building Services Student Conference, Hong Kong. Cost £990.

3.2 Study skills

Students are expected to prepare for lecture/tutorial sessions and workshop, to read directed materials, and to use other materials in their preparation. Students are also expected to spend time on completing homework and assignments. More hours are expected during the workshop when it takes place to practice skills and apply concepts into a real exercise.

Students are expected to take part in discussion and review material to demonstrate their understanding of issues in the context of Building Services Engineering and the environment. Seminars and practical sessions will further students understanding of Engineering Services by enabling them to explore concepts in detail. There will be opportunities for group working allowing students to develop a range of skills including numeracy, self-organisation, accessing information and effective communication and presentation skills.

There are a variety of services to support students and these include WISER <http://www.uclan.ac.uk/students/study/wiser/index.php>



3.3 Learning resources

3.3.1 Learning Information Services (LIS)

Extensive [resources](#) are available to support your studies provided by LIS – library and IT staff. Take advantage of the free training sessions designed to enable you to gain all the skills you need for your research and study.

3.3.2 Electronic Resources

LIS provide access to a huge range of electronic resources – e-journals and databases, e-books, images and texts.

Materials such as CIBSE, ASHRAE and other relevant guides can either be access from the library data base or upon request can be uploaded by lecturers on e-learn.

3.4 Personal development planning

Personal development planning is closely related to the acquisition of personal transferable skills and developing such skills is an integral part of the course. Academic skills alone are clearly insufficient to meet the demands of Building Services Engineers. The development of additional interpersonal qualities is essential to enable you to initiate, direct and control events effectively. To help achieve this objective, much of the tutorial and assignment work in the modules will provide you with the opportunity for practical project work and the development of problem solving skills.

Self and peer assessment forms part of your group projects, presentation exercises and the final year project, as it is important to remember that when you leave education, it will be crucial that you the ability and confidence to rely on your own judgement of yourself and your peers.

Employers do not simply look for basic competences such as in numeracy, literacy and communication skills, but also for motivation, time management, decision making, reliability, team work and leadership skills. Your programme of study has been designed to help you to develop all of the above-mentioned skills and more.



3.5 Preparing for your career

Your future is important to us, so to make sure that you achieve your full potential whilst at university and beyond, your course has been designed with employability learning integrated into it at every level. This is not extra to your degree, but an important part of it which will help you to show future employers just how valuable your degree is. These “Employability

Essentials” take you on a journey of development that will help you to write your own personal story of your time at university:

- To begin with, you will explore your identity, your likes and dislikes, the things that are important to you and what you want to get out of life.
- Later, you will investigate a range of options including jobs and work experience, postgraduate study and self- employment,
- You will then be ready to learn how to successfully tackle the recruitment process.

It’s your future: take charge of it!

[Futures](#) offers a range of support for you including:

- career and employability advice and guidance
- access to work placements, internships, voluntary opportunities, part-time employment and live projects
- workshops, seminars, modules, certificates and events to develop your skills
- business start-up, freelance and self-employment advice

- the Futures Award, a University Certificate which formally recognises your employability and enterprise achievements whilst at UCLan.

For more information come along and visit the team, or access our careers and employability resources via www.uclan.ac.uk/futures.

The bulk of our intake is part-time and therefore our students are already employed in the industry holding varied positions such as designers, project engineers, contract engineers, maintenance managers etc. However, the few full-time intakes can always be advised by their tutors on how their modules are helpful in their practical careers. For example they are advised on why and how design projects and systems design modules are useful if they want to pursue a career in design consultancies and how plant & maintenance and controls modules are useful in a maintenance job etc. We also do encourage old graduates to come and talk to our existing students to give them advice and talk about their personal experience. In addition, we do receive vacancies from companies requiring graduate engineers. Those will be forwarded to those who are seeking employment and in most cases they are successful in securing a job.

4. Student Support

There is a centralised Student and Academic Support Service which has [The 'i'](#) Student Information Centre as its first point of contact. You can obtain information on a wide range of topics including student administration such as Council Tax and letters to verify your status. The 'i' can also direct you to the right place to find information on Scholarships, Counselling, Student Finance, Mentoring, Studying Abroad, Disability Advice, Independent Academic Advice, International Advice, Multi Faith Centre, Pre School Centre, Medical Centre and general life in Preston/Burnley.



4.1 Academic Advisors

Your Academic Advisor is someone you can go to for help and advice relating to your course. You will be contacted by them from time-to-time to see how you are going on and to help you address any issues or concerns.

4.2 Students with disabilities

If you have a disability that may affect your studies, please either contact the Disability Advisory Service - disability@uclan.ac.uk - or let one of the course team know as soon as possible. With your agreement information will be passed on to the Disability Advisory Service. The University will make reasonable adjustments to accommodate your needs and to provide appropriate support for you to complete your study successfully. Where necessary, you will be asked for evidence to help identify appropriate adjustments.

Assessment arrangements for students with a disability

Arrangements are made for students who have a disability/learning difficulty for which valid supporting evidence can be made available. Contact the Disability Adviser for advice and information, disability@uclan.ac.uk

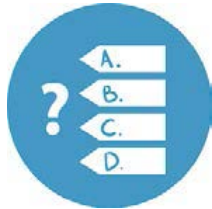
4.3 Students' Union

The Students' Union offers thousands of volunteering opportunities ranging from representative to other leadership roles. We also advertise paid work and employ student staff on a variety of roles. You can find out more information on our website:

<http://www.uclansu.co.uk/>

5. Assessment

Please note that all modules will be assessed. You are expected to attempt all required assessments for each module for which you are registered, and to do so at the times scheduled unless authorised extensions, special arrangements for disability, or extenuating circumstances allow you to defer your assessment.



5.1 Assessment Strategy

Depending on the learning outcomes and the nature of the module the assessment strategies can be:

- By completion of assignments and problem-based examinations in the engineering and related modules throughout the programme.
- By presentations, design-based projects.
- By student presentations, group work, design projects, dissertation, examination.
-

5.2 Notification of assignments and examination arrangements

Students will be notified of individual and /or group assignments as well as final assessments and their respective deadlines for submission within module information packs. Assignment brief are uploaded on Blackboard for student access. The date and time of the submission will be clear on the assignment brief together with the marking criteria for each part of the assignment.

5.3 Referencing

The referencing details will be set out on the assignment brief given out to students. Usually the course adopts the Harvard referencing style.

5.4 Confidential material

Students should be aware of the ethical and legal responsibilities to respect confidentiality and maintain the anonymity of individuals and organisations within their assignments.

5.5 Cheating, plagiarism, collusion or re-presentation

Please refer to the information included in section 6.6 of the University Student Handbook for full definitions. The University uses an online Assessment Tool called Turnitin. A pseudo-Turnitin assignment will be set up using the School space on Blackboard to allow students to check as many drafts as the system allows before their final submission to the 'official' Turnitin assignment. Students are required to self-submit their own assignment on Turnitin and will be given access to the Originality Reports arising from each submission. In operating Turnitin, Schools must take steps to ensure that the University's requirement for all summative assessment to be marked anonymously is not undermined and therefore Turnitin reports should either be anonymised or considered separately from marking. Turnitin may also be used to assist with plagiarism detection and collusion, where there is suspicion about individual piece(s) of work.

You are required to sign a declaration indicating that individual work submitted for an assessment is your own.

If you attempt to influence the standard of the award you obtain through cheating, plagiarism or collusion, it will be considered as a serious academic and disciplinary offence as described within the [Academic Regulations: G7](#) and the [Assessment Handbook](#) .

- Cheating is any deliberate attempt to deceive and covers a range of offences described in the [Assessment Handbook](#).
- Plagiarism describes copying from the works of another person without suitably attributing the published or unpublished works of others. This means that all quotes, ideas, opinions, music and images should be acknowledged and referenced within your assignments.
- Collusion is an attempt to deceive the examiners by disguising the true authorship of an assignment by copying or imitating in close detail another student's work - this includes with the other student's consent and, also when 2 or more students divide the elements of an assignment amongst themselves and copy one another's answers. It does not include the normal situation in which you learn from your peers and share ideas, as this generates the knowledge and understanding necessary for each individual to independently undertake an assignment; nor should it be confused with group work on an assignment which is specifically authorised in the assignment brief.
- Re-presentation is an attempt to gain credit twice for the same piece of work.

For further information on plagiarism Students can refer to the [The Alternative Guide](#) on UCLan (TAG) website.

Students can check their work for plagiarism through a powerful tool called "Turnitin". Students can upload their piece of work and check for plagiarism. For further information refer to [Student Guide to Submitting Turnitin assignments](#)

The process of investigation and penalties which will be applied can be reviewed in the [Assessment Handbook](#), section 5. If an allegation is found to be proven then the appropriate penalty will be implemented:

In the case of a single offence of cheating, plagiarism, collusion or re-presentation:

- the penalty will be 0% for the element of assessment, and an overall fail for the module.
- the plagiarised element of assessment must be resubmitted to the required standard and the mark for the module following resubmission will be restricted to the minimum pass mark (ie 40% for levels 4, 5 and 6 work, 50% for level 7 work).
- when it is detected for the first time on a resubmission for an already failed module, no further resubmission for the module will be permitted, and the appropriate fail grade will be awarded.

In the event of a repeat offence of cheating, plagiarism, collusion or re-presentation (irrespective of whether the repeat offence involves the same form of unfair means) on the same or any other module within the course:

- the appropriate penalty will be 0% for the module with no opportunity for re-assessment. This penalty does not preclude you being able to retake the module in a subsequent year.

The penalties will apply if you transfer from one UCLan course to another during your period of study and module credits gained on the former course are transferred to the current course.

6. Classification of Awards

The University publishes the principles underpinning the way in which awards and results are decided in [Academic Regulations](#). Decisions about the overall classification of awards

are made by Assessment Boards through the application of the academic and relevant course regulations.



7. Student Feedback

You can play an important part in the process of improving the quality of this course through the feedback you give. In addition to the on-going discussion with the course team throughout the year, there are a range of mechanisms for you to feedback about your experience of teaching and learning. We aim to respond to your feedback and let you know of our plans for improvement.

Student feedback is vital to the course improvement. For example, students would express concerns regarding accommodation, subject delivery, assessments and timetable. These concerns can always be useful to the course delivery and its improvement.

The SLO and the Students Union can support you in voicing your opinion, provide on-going advice and support, and encourage your involvement in all feedback opportunities. They will be requesting that you complete the National Student Survey (during semester 2 for students in their final year of study) or the UCLan Student Survey (all other students).

Other opportunities are available for students to voice their opinion such as SSLC (as noted below). Other means can be through Module Evaluation Questionnaires (MEQs) at the end of each module.

7.1 Student Staff Liaison Committee meetings (SSLCs)

Details of the Protocol for the operation of SSLCs is included in section 8.2 of the University Student Handbook.

The purpose of a SSLC meeting is to provide the opportunity for course representatives to feedback to staff about the course, the overall student experience and to inform developments which will improve future courses. These meetings are normally scheduled once per semester. Your Course Leader will facilitate the meetings using [Guidelines](#) and provide a record of the meeting with any decisions and / or responses made and / or actions taken as a result of the discussions held. The meetings include discussion of items forwarded by course representatives, normally related to the following agenda items (dependent on time of year). Your Student Engagement Assistant will be invited to attend and support the resolution of any issues. The course team encourage student feedback in all areas and recognise that additional items for discussion may also be raised at the meeting

- Update on actions completed since the last meeting
- Feedback about the previous year – discussion of external examiner’s report; outcomes of National /UCLan student surveys.
- Review of enrolment / induction experience;
- Course organisation and management (from each individual year group, and the course overall);
- Experience of modules - teaching, assessment, feedback;
- Experience of academic support which may include e.g. Personal Development Planning, Academic Advising arrangements and The Card;
- Other aspects of University life relevant to student experience e.g. resources, IT, library;
- Any other issues raised by students or staff.

Course representatives are elected at the beginning of the Academic year. Usually students either come forward or get nominated by other members of the class. Usually, and depending

on the size of the class, one or two student reps can be elected, and where the class is a mixture of full and part timers one for each will represent the class.

Student-staff Liaison meetings take place twice a year; once in each semester. Students will be notified by e-mail about the date, time and place of the scheduled meetings. Thereafter, an action plan will be drafted and students will receive feedback about actions taken as a result of discussions held within 15 working days.

Explain to Partner College students that they will be able to access SU on-line course representative training. You may wish to add that the notes of SSLC meetings are shared with the host School for this course or you may need to explain that the host school manages the SSLC meetings (where relevant).

**Table 2: Programme Structure for Full-Time Study
BEng (Hons) Building Services and Sustainable Engineering**

Year 1			Year 2			Year 3		
<i>120 credits compulsory modules</i>			<i>120 Credits compulsory modules</i>			<i>80 credits compulsory modules</i>		
ER1010	Engineering Analysis	30	NT2053	Electrical Supply and Distribution	20	NT3036	Systems Design	20
ER1020	Engineering Design	30	NT2054	Mechanical Services Design	20	NT3037	Plant and Maintenance	20
ER1030	Engineering Science	30	NT2055	Thermodynamics and Fluid Mechanics 2	20	NT3038	Design Project 3	20
ER1431	Building Services Engineering Fundamentals	30	NT2060	Engineering Analysis 3	10	NT3048	Engineering Dissertation	20
			NT2062	Lighting installation and Design	10			
			NT2066	Computing (CAD)	20	<i>Optional modules:</i> Select one to make 120 credits		
			NT2059	Design Project 2	10	NT3039	Environmental and Safety Law	10
			BN2505	Civil Engineering Contract law	10	NT3040	Engineering Analysis 4	10
			<i>Optional modules:</i> (for Sandwich mode only)			NT3042	Intelligent Buildings	20
			BN2830	Industrial Experience	120	NT3046	Alternative Energy Technology	20
						BN3010	Project Management	20

**Table 3: Programme Structure for Full-Time Study
MEng (Hons) Building Services and Sustainable Engineering**

Year 1			Year 2			Year 3			Year 4		
<i>120 credits compulsory modules</i>			<i>120 Credits compulsory modules</i>			<i>60 credits compulsory modules</i>			<i>120 credits compulsory modules</i>		
ER1010	Engineering Analysis	30	NT2053	Electrical Supply and Distribution	20	NT3036	Systems Design	20	NT4021	HVAC Design for a Sustainable Environment	20
ER1020	Engineering Design	30	NT2054	Mechanical Services Design	20	NT3037	Plant and Maintenance	20	NT4025	Sustainable Electrical Services and Lighting	20
ER1030	Engineering Science	30	NT2055	Thermodynamics and Fluid Mechanics 2	20	NT3038	Design Project 3	20	NT4035	Carbon Management and Policy	20
ER1431	Building Services Engineering Fundamentals	30	NT2060	Engineering Analysis 3	10	NT3048	Engineering Dissertation	20	NT4023	Engineering Design Project	20
			NT2062	Lighting installation and Design	10	<i>Optional modules: Select to make total up to 120 credits</i>			BN4522	Integrated Project	40
			NT2066	Computing (CAD)	20	NT3039	Environmental and Safety Law	10			
			NT2059	Design Project 2	10	NT3040	Engineering Analysis 4	10			
			BN2505	Civil Engineering Contract law	10	BN3010	Project Management	20			
			<i>Optional module: (for Sandwich mode only)</i>			NT3042	Intelligent Buildings	20			
			BN2830	Industrial Experience	120	NT3046	Alternative Energy Technology	20			

8. Appendices

UNIVERSITY OF CENTRAL LANCASHIRE

Programme Specification

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided.

Sources of information on the programme can be found in Section 17.

1. Awarding Institution / Body	University of Central Lancashire
2. Teaching Institution	University of Central Lancashire Hong Kong Vocational Training Council (year 3 only)
3. University Department/Centre	School of Engineering
4. External Accreditation	CIBSE, EI
5. Title of Final Award	BEng(Hons) Building Services and Sustainable Engineering
6. Modes of Attendance offered	Full-time, Part-time, Sandwich
7. Codes	UCAS: KH22 JACs: H100; H300; K200; K210 HECos: 100147
8. Relevant Subject Benchmarking Group(s)	Building & Surveying (2014) Engineering (2014)
9. Other external influences	Professional Body accreditation guidance documentation
10. Date of production/revision of this form	October 2018

11. Aims of the Programme

- To provide a suitable basis in the fundamentals and principles of Building Services and Sustainable Engineering
- To provide students with a suitable basis in the fundamentals and principles of Building Services and Sustainable Engineering
- To enable students to undertake independent critical thought, enhancing and extending their intellectual development
- To encourage students to approach their academic and subsequent professional careers as creative and innovative
- To ensure that successful graduates will have the potential to contribute to significant advances in engineering and technology

12. Learning Outcomes, Teaching, Learning and Assessment Methods**A. Knowledge and Understanding**

A1. Apply the principles, theories, essential facts, and concepts of building services and sustainable engineering and technology

A2. Demonstrate the competent use and application of mathematical skills to the resolution of building services and sustainable engineering and technology

A3. Apply law and managerial skills, and identify aspects of social, environmental, ethical, economical and commercial engineering and technology

A4. Use industry standard computational programmes and peripherals in the application of projects, problems and systems

Teaching and Learning Methods

Learning outcome A1 is achieved by the use of a range of design based exercises, lectures and tutorials. Outcomes A2, A3 and A4 are achieved by the use of design based exercises, lectures and tutorials.

Assessment methods

By completion of assignments and problem based examinations in the engineering and related modules throughout the programme.

B. Subject-specific skills

B1. Apply positive and enthusiastic attitude to Building Services Engineering to achieve competence through participation in the course

B2. Display a critical awareness of the significance and scope of their chosen discipline, particularly its contribution to society

B3. Evaluate the appropriateness of different approaches to solving problems related to building services and sustainable engineering and technology

B4. Initiate, devise and develop a working personal and professional development plan by participation on the course

Teaching and Learning Methods

Learning outcome B1 is achieved across the course modules. At level 6 the use of the design project and dissertation is used to achieve B2, B3 and B4.

Assessment methods

Assessed by presentations, professional reports and design based projects.

C. Thinking Skills

C1. Identify and analyse broadly defined problems, evaluate optional strategies and optimise appropriate solutions to building services and sustainable engineering and technology

C2. Apply underlying concepts and principles outside the context in which they were first studied;

C3. Apply an in-depth understanding of the wide picture, and how can influence analyses and interpretations based on building services and sustainable engineering and technology

Teaching and Learning Methods

Outcome C1 is achieved by the use of design based modules which involve individual and team based design activities and 6.

Assessment methods

Assignments and examination.

D. Other skills relevant to employability and personal development

D1. Communicate ideas effectively and imaginatively in a clear and concise manner to persons in related professions

D2. Present, evaluate and interpret qualitative and quantitative data, to develop lines of argument and make sound judgements

D3. Effectively communicate information, arguments and analysis, in a variety of forms, to specialist and non-specialist audiences

D4. Progress and develop key learning skills and acquire new competences in a structured manner by use of a personal learning plan

D5. Demonstrate qualities and transferable skills necessary for employment requiring the exercise of personal responsibility

Teaching and Learning Methods

These skills are embedded in all programme modules, with specific reference in the mathematics, computing and professional practice modules.

Assessment methods

Student presentations, group work, design projects, dissertation, examination

13. Programme Structures*

Level	Module Code	Module Title
Level 6	NT3036	Systems Design
	NT3037	Plant and Maintenance
	NT3038	Design Project 3
	NT3048	Engineering Dissertation
		Optional Modules
	BN3010	Project Management & BIM
	NT3039	Environmental & Safety Law
	NT3042	Intelligent Buildings
	NT3046	Alternative Energy Technology
	NT3040	Engineering Analysis 4
Level 5	NT2053	Electrical Supply and Distribution
	NT2054	Mechanical Services Design
	NT2055	Thermodynamics and Fluid Mechanics
	NT2066	Computing (CAD & BIM)
	NT2059	Design Project 2
	NT2060	Engineering Analysis 3

	NT2062	Lighting Installation and Des
	BN2505	Civil Engineering Contract L
	Optional Module	
	BN2830	Industrial Placement
Level 4	ER1010	Engineering Analysis
	ER1020	Engineering Design
	ER1030	Engineering Science
	ER1431	Building Services Engineerin
Level 3	ERC001	Study Skills
	ERC002	Basic Mathematics
	ERC003	Information Technology and
	ERC004	Practical Skills
	ERC005	Design Studies
	ERC006	Analytical Studies

15. Personal Development Planning

Personal development planning is closely related to the acquisition of personal transferable skills and developing such skills is an integral part of the course. Academic skills alone are clearly insufficient to meet the demands of Building Services Engineers. The development of additional interpersonal qualities is essential to enable you to initiate, direct and control events effectively. To help achieve this objective, much of the tutorial and assignment work in the modules will provide you with the opportunity for practical project work and the development of problem solving skills.

Self and peer assessment forms part of your group projects, presentation exercises and the final year project, as it is important to remember that when you leave education, it will be crucial that you the ability and confidence to rely on your own judgement of yourself and your peers.

Employers do not simply look for basic competences such as in numeracy, literacy and communication skills, but also for motivation, time management, decision making, reliability, team work and leadership skills. Your programme of study has been designed to help you to develop all of the above mentioned skills and more.

16. Admissions criteria

A-Level: BBC including Maths and other science subject (such as physics, chemistry, further maths). General Studies accepted

English language requirement:

Where English was not the medium of instruction at secondary school, a recognized English language qualification is requested as following: IELTS: 6.0 overall with at least 5.5 in each component of listening, reading, speaking and writing.

BTEC Extended Diploma: Distinction, Merit, Merit

BTEC Diploma: Distinction*, Distinction*(to include maths module).

International Baccalaureate Diploma: 28P including grade HL5 in Maths.

GCSE: Maths & English C or equivalent The majority of applicants are admitted with advanced standing. For entry with advanced standing:-

- HNC in Building Services or an appropriate technological subject with give APL for up to 3 modules (depending on the subject).

- HND in Building Services or an appropriate technological subject with give APL for up to 6 modules (depending on the subject).

Mature students with relevant work and experiential learning will be considered by interview.

Specific entry requirements for direct entry to Level 6 only VTC, Hong Kong only

Higher Diploma graduates possessing the following qualification are eligible to apply for this course:

1. A VTC Higher Diploma in Building Services Engineering

As the programme is both taught and assessed in English, applicants must be able to demonstrate a proficiency level of fluency in the language for their studies at IELTS 6 or TOFEL 550 or equivalent.

Exceptionally, candidates who do not satisfy the requirement of the above may be admitted to the programme at the discretion of the School of Engineering of the University, subject to interview and assessment of commitment.

Mature students with relevant work and experiential learning will be considered by interview.

17. Key sources of information about the programme

- www.uclan.ac.uk/facs/destech/builtenv/bui001
- Factsheet

Curriculum Skills Map for BEng (Hons) Building Services and Sustainable Engineering

Level	Module Code	Module Title	Compulsory or Optional	Programme Learning Outcomes															
				Knowledge & understanding				Subject-specific Skills				Thinking Skills			Other skills relevant to employability and personal development				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4	D5
LEVEL 6	NT3037	Plant and Maintenance	Comp	✓	✓				✓	✓		✓							
	NT3036	Systems Design	Comp	✓	✓		✓		✓	✓		✓	✓						
	NT3048	Engineering Dissertation	Comp					✓	✓	✓		✓	✓			✓			✓
	NT3038	Design Project 3	Comp				✓	✓	✓	✓	✓		✓		✓		✓	✓	✓
	BN3010	Project Management & BIM	Opt			✓			✓										
	NT3039	Environmental & Safety Law	Opt			✓		✓							✓				
	NT3042	Intelligent Buildings	Opt	✓			✓			✓									
	NT3040	Engineering Analysis 4	Comp		✓										✓				
NT3046	Alternative energy technology	Opt	✓			✓				✓									
LEVEL 5	NT2062	Lighting Installation and Design	Comp	✓	✓			✓		✓	✓						✓	✓	
	NT2053	Electrical Supply & Distribution	Comp	✓	✓			✓		✓	✓						✓	✓	
	NT2055	Thermodynamics & Fluid Mechanics 2	Comp	✓											✓				
	NT2059	Design Project 2	Comp	✓	✓			✓		✓	✓	✓	✓		✓			✓	
	NT2054	Mechanical Services Design	Comp	✓															
	NT2066	Computing (CAD & BIM)	Comp				✓			✓	✓	✓	✓		✓	✓	✓	✓	
	NT2060	Engineering Analysis 3	Comp	✓	✓														
	BN2505	Civil Engineering Contract Law	Comp			✓	✓					✓						✓	✓
BN2830	Industrial Placement	Opt					✓	✓		✓				✓	✓	✓	✓	✓	
LEVEL 4	ER1020	Engineering Design	Comp					✓	✓	✓		✓	✓			✓			✓
	ER1010	Engineering Analysis	Comp	✓	✓		✓	✓	✓		✓	✓			✓	✓	✓	✓	
	ER1030	Engineering Science	Comp	✓	✓	✓				✓					✓	✓	✓		✓
	ER1431	Building Services Engineering Fundamentals	Comp	✓		✓	✓	✓		✓	✓	✓			✓		✓	✓	

19. Learning Outcomes for Exit Awards

BEng Building Services and Sustainable Engineering

The learning outcomes for the BEng (Hons) Building Services and Sustainable Engineering and the award of BEng Building Services and Sustainable Engineering is based on meeting the learning outcomes listed below:

- A1. Apply the principles and concepts of building services and sustainable engineering and its underpinning science and mathematics, and their relevance to the future practice of a graduate engineer.
- A2. Demonstrate the use and application of mathematical skills to the resolution of building services and sustainable engineering problems
- A3. Apply law and managerial skills, and identify aspects of social, environmental, ethical, economical and commercial considerations affecting the exercise of engineering decision-making and judgement.
- A4. Use industry standard computational programmes and peripherals in the application of projects, problems and simulations.
- B1. Apply positive attitude to Building Services Engineering through participations in seminars, laboratories, workshops, individual & group project work, design and use of computer software.
- B2. Display an awareness of the significance and scope of their chosen discipline, particularly its contribution to the built environment and to society
- B3. Evaluate the appropriateness of different approaches to solving problems related to building services and sustainable engineering
- B4. Initiate, a working personal and professional development plan by participation on the course programme, completing the necessary key skills and working with tutors within a structured and managed learning environment
- C1. Identify defined problems, evaluate optional strategies and optimise appropriate solutions to problems in the fields of Building Services and Sustainable Engineering
- C2. Apply underlying concepts and principles outside the context in which they were first studied;
- C3. Apply an understanding of the wide picture, and how can influence analyses and interpretations based on this knowledge through solving problems.
- D1. Communicate ideas in a clear manner to persons in related professions and those outside the industry
- D3. Effectively communicate information, arguments and analysis, in a variety of forms, to specialist and non-specialist audiences and deploy key techniques of Building Services and Sustainable Engineering
- D4. Progress key learning skills and acquire new competences in a structured manner by use of a personal and professional development plan.
- D5. Demonstrate qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision making.

Diploma in Higher Education

The learning outcomes for the Diploma in Higher Education gained through this programme are as follows and the award is based on meeting many of the learning outcomes listed:

- A1.** Demonstrate a sound knowledge of the fundamentals of building services and sustainable engineering and their relevance to the future practice of a graduate engineer
- A2.** Demonstrate the competent use and application of mathematical skills to the resolution of building services and sustainable engineering problems
- A4.** Use industry standard computational programmes and peripherals in the application of projects, problems and simulations.
- B1.** Demonstrate a learned positive and enthusiastic attitude to their chosen field of engineering through participations in seminars and workshops
- B2.** Display a critical awareness of the significance and scope of their chosen discipline, particularly its contribution to the built environment and to society
- B3.** Evaluate the appropriateness of different approaches to solving problems related to building services and sustainable engineering
- C1.** Identify and analyse broadly defined problems, evaluate optional strategies and optimise appropriate solutions to problems in the fields of Building Services and Sustainable Engineering
- C2.** Apply underlying concepts and principles outside the context in which they were first studied;
- D1.** Communicate ideas effectively and imaginatively in a clear and concise manner to persons in related professions and those outside the industry
- D4.** Progress and develop key learning skills and acquire new competences in a structured manner by use of a personal and professional development plan that will enable the candidates to assume significant responsibility within organisations
- D5.** Demonstrate qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision making.

Certificate in Higher Education

The learning outcomes for the Certificate in Higher Education gained through this programme are as follows and the award is based on meeting some of the learning outcomes listed:

- A2.** Demonstrate the competent use and application of mathematical skills to the resolution of building services and sustainable engineering problems
- A4.** Use industry standard computational programmes and peripherals in the application of projects, problems and simulations.
- B3.** Evaluate the appropriateness of different approaches to solving problems related to building services and sustainable engineering
- C1.** Identify and analyse broadly defined problems, evaluate optional strategies and optimise appropriate solutions to problems in the fields of Building Services and Sustainable Engineering
- C2.** Apply underlying concepts and principles outside the context in which they were first studied;

- D4.** Progress and develop key learning skills and acquire new competences in a structured manner by use of a personal and professional development plan that will enable the candidates to assume significant responsibility within organisations
- D5.** Demonstrate qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision making.

UNIVERSITY OF CENTRAL LANCASHIRE

Programme Specification

This Programme Specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided.

Sources of information on the programme can be found in Section 17.

1. Awarding Institution / Body	University of Central Lancashire
2. Teaching Institution	University of Central Lancashire
3. University Department/Centre	School of Engineering
4. External Accreditation	n/a
5. Title of Final Award	MEng (Hons) Building Services and Sustainable Engineering
6. Modes of Attendance offered	Full-time / Part-time /Sandwich
7. Codes	UCAS: TBA JACs: H100; H300; K200; K210 HECos: 100147
8. Relevant Subject Benchmarking Group(s)	Civil Engineering (2015), Engineering (2010)
9. Other external influences	
10. Date of production/revision of this form	October 2018
11. Aims of the Programme	<ul style="list-style-type: none"> • To provide students with the opportunity to develop comprehensive knowledge and understanding of the fundamentals and principles of Building Services and Sustainable Engineering in order to maintain and manage applications of current and developing technology, and to cope with the future developments during their career including sustainable design, construction, control and operations. Thereby affording graduates the opportunity to fulfil the educational requirements to become full Chartered Building Services Engineers. • To meet the requirement for full registration with the Engineering Council as a CEng (Chartered Engineer) • To provide an extended, enhanced, and industrially relevant integrated master's programme of study in preparation for professional practice. • To enable students to undertake independent critical thought and analysis, enhancing and extending their intellectual development whilst becoming conversant with the nature of the industry, thereby developing the ability to develop and achieve optimal solutions to modern building requirements and complex engineering problems. • To encourage students to approach their academic and subsequent professional careers as creative and innovative individuals.

- To ensure that successful graduates will have the potential to contribute to significant advances in building design and engineering disciplines associated with their industry of choice.

12. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

A1. Apply the principles, theories, essential facts, and concepts of building services and sustainable engineering and its underpinning science and mathematics, and their relevance to the future practice of a graduate engineer.

A2. Demonstrate the competent use and application of mathematical skills to the resolution of sustainable engineering problems in buildings.

A3. Apply the application of law and managerial skills in terms professional and ethical responsibilities as well as health and safety in the context of Building Services design and Sustainable engineering projects.

A4. Use industry standard computational programmes and peripherals in the application of projects, problems and simulations.

Teaching and Learning Methods

A range of design based exercises, formal lectures, seminars and tutorials. In addition, learning outcomes are all achieved by completion of the respective subject for both compulsory and optional modules based upon problem solving techniques including project management methods and economic issues that impact upon certain project.

Details depend on individual module.

Assessment methods

By completion of assignments and problem based examinations in the architecture and engineering and related modules throughout the programme.

B. Subject-specific skills

B1. Apply a positive engagement, independent planning and execution of the chosen projects in the field of Building Services and Sustainable Engineering. This can be achieved through workshops, laboratories, group and individual project work, and use of the computer software.

B2. Display a critical awareness of the significance and scope of their chosen discipline, particularly its contribution to the built environment and to society.

B3. Develop solutions of different approaches to solve problems related to building design, services and sustainable engineering.

B4. Initiate, devise and develop a working personal and professional development plan by participation on the course programme, completing the necessary key skills and working with tutors within a structured and managed learning environment.

Teaching and Learning Methods

Formal lectures, seminars and tutorials, laboratory classes; preparation of laboratory reports and interpretation of data. Individual study and group based activities in design project and dissertation modules.

Details depend on individual module.

Assessment methods

Assessed by presentations, design based projects

C. Thinking Skills

C1. Identify and critically analyse broadly defined problems, evaluate optional strategies and optimise appropriate solutions to problems in the fields of modern of Building Services design and its Sustainable Engineering.

C2. Apply underlying concepts and principles outside the context in which they were first studied.

C3. Apply and develop an in-depth understanding of the wide picture, and how can influence analyses and interpretations based on this knowledge through solving abstract and complex problems using different concepts and design methodologies at an appropriate level of detail.

Teaching and Learning Methods

Lectures and case studies, individual and team based research project activities through which investigation, critical thinking and problem solving are achieved.

Details depend on individual module.

Assessment methods

Assignments and examination.

D. Other skills relevant to employability and personal development

D1. Communicate ideas effectively and imaginatively in a clear and concise manner to people in related professions and those outside the industry.

D2. Present, critically evaluate and interpret qualitative and quantitative data, to develop lines of argument and make sound judgements in accordance with basic theories and concepts of Building Services design and its Sustainable Engineering.

D3. Effectively communicate information, critical argument and comprehensive analysis, in a variety of forms, to specialist and non-specialist audiences and deploy key techniques of Building Services design and its Sustainable Engineering.

D4. Progress and develop key learning skills and acquire new competences in a structured manner by use of a personal and professional development plan that will enable the candidates to assume significant responsibility within organisations.

D5. Demonstrate qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision making.

Teaching and Learning Methods

Presentations, discussions and team work in classes and residential workshops with specific reference to calculation techniques, computing through the use of relevant design software and group project.

Details depend on individual module.

Assessment methods

Student presentations, group work, design projects, dissertation, examination

13. Programme Structures*				14. Awards and Credits*
Level	Module Code	Module Title	Credit rating	
Level 7	NT4021	HVAC Design for a Sustainable Environment	20	MEng (Hons) Building Services and Sustainable Engineering Requires 480 credits, with a minimum of 480 at Level 4 or above, 360 at Level 5 or above, 220 at Level 6 or above (excluding NT3048), and 120 at Level 7.
	NT4025	Sustainable Electrical Services and Lighting	20	
	NT4035	Carbon Management and Policy	20	
	NT4023	Engineering Design Project	20	
	BN4502	Integrated Project	40	
Level 6	NT3036	Systems Design	20	BEng (Hons) Building Services & Sustainable Engineering Requires 360 credits including a minimum of 220 at Level 5 or above and 100 at Level 6
	NT3037	Plant and Maintenance	20	
	NT3038	Design Project 3	20	
	NT3048	Engineering Dissertation	20	
				BEng Building Services & Sustainable Engineering Requires 320 credits including a minimum of 180 at Level 5 or above and 60 at Level 6 Students who successfully complete module BN2830 will receive the award with Industrial Placement
	Optional Modules			
	NT3040	Engineering Analysis 4	10	
	BN3010	Project Management	20	
	NT3039	Environment & Safety Law	10	
	NT3042	Intelligent Buildings	20	
	NT3046	Alternative Energy Technology	20	
Level 5	NT2053	Electrical Supply and Distribution	20	Dip HE Building Services & Sustainable Engineering
	NT2054	Mechanical Services Design	20	

	NT2055	Thermodynamics and Fluid Mechanics 2	20	Requires 240 credits including a minimum of 100 at Level 5 or above
	NT2066	Computing (CAD)	20	
	NT2059	Design Project 2	10	
	NT2060	Engineering Analysis 3	10	
	NT2062	Lighting Installation and Design	10	
	BN2505	Civil Engineering Contract Law	10	
		Optional Module		
	BN2830	Industrial placement	120 notional	
Level 4	ER1010	Engineering Analysis	30	Cert HE Requires 120 credits at level 4 or above
	ER1020	Engineering Design	30	
	ER1030	Engineering Science	30	
	ER1431	Building Services Engineering Fundamentals	30	

**BN2830 Industrial placement module is available after the completion of level 5, or level 6 for the students who take Sandwich course (5 year Full-time).

15. Personal Development Planning

Personal development planning is closely related to the acquisition of personal transferable skills and developing such skills is an integral part of the course. Academic skills alone are clearly insufficient to meet the demands of Building Services engineers. The development of additional interpersonal qualities is essential to enable the student to initiate, direct and control events effectively. To help achieve this objective, much of the tutorial and assignment work in the modules will provide you with the opportunity for practical project work and the development of problem solving skills.

Self and peer assessments form part of your group projects, presentation exercises and the final year project, as it is important to remember that when you leave education, it will be crucial that the student has the ability and confidence to rely on his/her own judgement.

Employers do not simply look for basic competences such as in numeracy, literacy and communication skills, but also for motivation, time management, decision making, reliability, team work and leadership skills. Your programme of study has been designed to help you develop all of the above mentioned skills and more.

16. Admissions criteria

A-Level: BBC including Maths and other science subject (such as physics, chemistry, further maths). General Studies accepted

English language requirement:

Where English was not the medium of instruction at secondary school, a recognized English language qualification is requested as following: IELTS: 6.0 overall with at least 5.5 in each component of listening, reading, speaking and writing.

BTEC Extended Diploma: Distinction, Merit, Merit

BTEC Diploma: Distinction*, Distinction*(to include maths module).

International Baccalaureate Diploma: 28P including grade HL5 in Maths.

GCSE: Maths & English C or equivalent The majority of applicants are admitted with advanced standing. For entry with advanced standing:-

- HNC in Building Services or an appropriate technological subject with give APL for up to 3 modules (depending on the subject).

- HND in Building Services or an appropriate technological subject with give APL for up to 6 modules (depending on the subject).

Mature students with relevant work and experiential learning will be considered by interview.

17. Key sources of information about the programme

- www.uclan.ac.uk
- Factsheet

18. Curriculum Skills Map

Level	Module Code	Module Title	Comp or Opt	Programme Learning Outcomes															
				Knowledge & understanding				Subject-specific Skills				Thinking Skills			Other skills relevant to employability and personal development				
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	D1	D2	D3	D4	D5
LEVEL 7	NT4021	HVAC Design for a Sustainable Environment	Comp	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	NT4025	Sustainable Electrical Services and Lighting	Comp	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	BN4502	Integrated Project	Comp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	NT4023	Engineering Design Project	Comp	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	NT4035	Carbon Management and Policy	Comp	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
LEVEL 6	NT3037	Plant and Maintenance	Comp	✓	✓				✓	✓		✓							
	NT3036	Systems Design	Comp	✓	✓		✓		✓	✓		✓	✓						
	NT3048	Engineering Dissertation	Comp					✓	✓	✓		✓	✓		✓				✓
	NT3038	Design Project 3	Comp			✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓
	BN3010	Project Management	Opt			✓			✓										
	NT3039	Environment & Safety Law	Opt			✓		✓							✓				
	NT3042	Intelligent Buildings	Opt	✓			✓			✓									
	NT3040	Engineering Analysis 4	Opt		✓										✓				
NT3046	Alternative energy technology	Opt	✓			✓				✓									
LEVEL 5	NT2053	Electrical Supply & Distribution	Comp	✓	✓														
	NT2055	Thermodynamics & Fluid Mechanics 2	Comp	✓											✓				
	NT2059	Design Project 2	Comp					✓		✓	✓						✓	✓	
	NT2054	Mechanical Services Design	Comp	✓															
	NT2066	Computing (CAD) & BIM	Comp				✓			✓	✓	✓	✓		✓	✓	✓	✓	
	NT2060	Engineering Analysis 3	Comp	✓	✓														
	BN2505	Civil Engineering Contract Law	Comp			✓	✓					✓						✓	✓
BN2830	Industrial Placement	Opt					✓	✓		✓				✓	✓	✓	✓	✓	
LEVEL 4	ER1020	Engineering Design	Comp					✓	✓	✓		✓	✓		✓				✓
	ER1010	Engineering Analysis	Comp	✓	✓		✓	✓	✓		✓	✓		✓	✓	✓	✓	✓	
	ER1030	Engineering Science	Comp	✓	✓	✓				✓				✓	✓	✓	✓		✓
	ER1431	Building Services Engineering Fundamentals	Comp	✓		✓	✓	✓		✓	✓	✓		✓		✓	✓	✓	

19. Learning Outcomes for Exit Awards

BEng (Hons) Building Services and Sustainable Engineering

The learning outcomes for the BEng (Hons) Building Services and Sustainable Engineering and the award of BEng Building Services and Sustainable Engineering is based on meeting the learning outcomes listed below:

- A1. Apply the principles, theories, essential facts, and concepts of building services and sustainable engineering and its underpinning science and mathematics, and their relevance to the future practice of a graduate engineer.
- A2. Demonstrate the competent use and application of mathematical skills to the resolution of building services and sustainable engineering problems
- A3. Apply law and managerial skills, and identify aspects of social, environmental, ethical, economical and commercial considerations affecting the exercise of engineering decision-making and judgement.
- A4. Use industry standard computational programmes and peripherals in the application of projects, problems and simulations.
- B1. Apply positive and enthusiastic attitude to Building Services Engineering to achieve competence through participations in seminars, laboratories, workshops, individual & group project work, design and use of computer software.
- B2. Display a critical awareness of the significance and scope of their chosen discipline, particularly its contribution to the built environment and to society
- B3. Evaluate the appropriateness of different approaches to solving problems related to building services and sustainable engineering
- B4. Initiate, devise and develop a working personal and professional development plan by participation on the course programme, completing the necessary key skills and working with tutors within a structured and managed learning environment
- C1. Identify and analyse broadly defined problems, evaluate optional strategies and optimise appropriate solutions to problems in the fields of Building Services and Sustainable Engineering
- C2. Apply underlying concepts and principles outside the context in which they were first studied;
- C3. Apply an in-depth understanding of the wide picture, and how can influence analyses and interpretations based on this knowledge through solving problems using different concepts and design methodologies at an appropriate level of detail.
- D1. Communicate ideas effectively and imaginatively in a clear and concise manner to persons in related professions and those outside the industry
- D2. Present, evaluate and interpret qualitative and quantitative data, to develop lines of argument and make sound judgements in accordance with basic theories and concepts of Building Services and Sustainable Engineering

- D3. Effectively communicate information, arguments and analysis, in a variety of forms, to specialist and non-specialist audiences and deploy key techniques of Building Services and Sustainable Engineering
- D4. Progress and develop key learning skills and acquire new competences in a structured manner by use of a personal and professional development plan that will enable the candidates to assume significant responsibility within organisations
- D5. Demonstrate qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision making.

BEng Building Services and Sustainable Engineering

The learning outcomes for the BEng (Hons) Building Services and Sustainable Engineering and the award of BEng Building Services and Sustainable Engineering is based on meeting the learning outcomes listed below:

- A1. Apply the principles and concepts of building services and sustainable engineering and its underpinning science and mathematics, and their relevance to the future practice of a graduate engineer.
- A2. Demonstrate the use and application of mathematical skills to the resolution of building services and sustainable engineering problems
- A3. Apply law and managerial skills, and identify aspects of social, environmental, ethical, economical and commercial considerations affecting the exercise of engineering decision-making and judgement.
- A4. Use industry standard computational programmes and peripherals in the application of projects, problems and simulations.
- B1. Apply positive attitude to Building Services Engineering through participations in seminars, laboratories, workshops, individual & group project work, design and use of computer software.
- B2. Display an awareness of the significance and scope of their chosen discipline, particularly its contribution to the built environment and to society
- B3. Evaluate the appropriateness of different approaches to solving problems related to building services and sustainable engineering
- B4. Initiate, a working personal and professional development plan by participation on the course programme, completing the necessary key skills and working with tutors within a structured and managed learning environment
- C1. Identify defined problems, evaluate optional strategies and optimise appropriate solutions to problems in the fields of Building Services and Sustainable Engineering
- C2. Apply underlying concepts and principles outside the context in which they were first studied;
- C3. Apply an understanding of the wide picture, and how can influence analyses and interpretations based on this knowledge through solving problems.
- D1. Communicate ideas in a clear manner to persons in related professions and those outside the industry

- D3. Effectively communicate information, arguments and analysis, in a variety of forms, to specialist and non-specialist audiences and deploy key techniques of Building Services and Sustainable Engineering
- D4. Progress key learning skills and acquire new competences in a structured manner by use of a personal and professional development plan.
- D5. Demonstrate qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision making.

Diploma in Higher Education

The learning outcomes for the Diploma in Higher Education gained through this programme are as follows and the award is based on meeting many of the learning outcomes listed:

- A1. Demonstrate a sound knowledge of the fundamentals of building services and sustainable engineering and their relevance to the future practice of a graduate engineer
- A2. Demonstrate the competent use and application of mathematical skills to the resolution of building services and sustainable engineering problems
- A4. Use industry standard computational programmes and peripherals in the application of projects, problems and simulations.
- B1. Demonstrate a learned positive and enthusiastic attitude to their chosen field of engineering through participations in seminars and workshops
- B2. Display a critical awareness of the significance and scope of their chosen discipline, particularly its contribution to the built environment and to society
- B3. Evaluate the appropriateness of different approaches to solving problems related to building services and sustainable engineering
- C1. Identify and analyse broadly defined problems, evaluate optional strategies and optimise appropriate solutions to problems in the fields of Building Services and Sustainable Engineering
- C2. Apply underlying concepts and principles outside the context in which they were first studied;
- D1. Communicate ideas effectively and imaginatively in a clear and concise manner to persons in related professions and those outside the industry
- D4. Progress and develop key learning skills and acquire new competences in a structured manner by use of a personal and professional development plan that will enable the candidates to assume significant responsibility within organisations
- D5. Demonstrate qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision making.

Certificate in Higher Education

The learning outcomes for the Certificate in Higher Education gained through this programme are as follows and the award is based on meeting some of the learning outcomes listed:

- A2. Demonstrate the competent use and application of mathematical skills to the resolution of building services and sustainable engineering problems
- A4. Use industry standard computational programmes and peripherals in the application of projects, problems and simulations.
- B3. Evaluate the appropriateness of different approaches to solving problems related to building services and sustainable engineering
- C1. Identify and analyse broadly defined problems, evaluate optional strategies and optimise appropriate solutions to problems in the fields of Building Services and Sustainable Engineering
- C2. Apply underlying concepts and principles outside the context in which they were first studied;
- D4. Progress and develop key learning skills and acquire new competences in a structured manner by use of a personal and professional development plan that will enable the candidates to assume significant responsibility within organisations
- D5. Demonstrate qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision making.