University of Plymouth

Faculty of Arts, Humanities and Business

School of Art, Design and Architecture

Programme Specification

MSc High Performance Buildings
(5393)

30 April 2015

Amended by Minor Change: 17/11/2017
Revised: May 2020 (incorporation of January intake)

1. **MSc High Performance Buildings**

Final award title MSc High Performance Buildings

Level 7 Intermediate award title(s) PG Diploma (on completion of 120 taught credits)

Level 7 Intermediate award title(s) PG Certificate (on completion of any 60 taught credits)

UCAS code K290

JACS code K290

2. Awarding Institution: University of Plymouth
Teaching institution(s): University of Plymouth

3. Accrediting body(ies) Undergoing accreditation by CIBSE in 2017-2018

Summary of specific conditions/regulations

Date of re-accreditation

4. Distinctive Features of the Programme and the Student Experience

This new MSc High Performance Buildings is developed in synergy with the redesign of the undergraduate programme of school of Architecture, Design and Environment as part of the Curriculum Enrichment Project (CEP), especially the provision of a BSc in Architectural Engineering.

It aims to develop a new 'technology pathway' in the School that comprises of:

BSc Architectural Engineering ► MSc High Performance Buildings ► PhD in Building Performance Analysis. Both the MSc High Performance Buildings and the BSc Architectural Engineering are part of the School and Faculty Plan for 2014-15, as approved by the VCE.

The programme aims to capitalize on the research in the area of Building Performance Analysis, which is one of the strong research pillars of the School of Architecture, Design and Environment. Since 2005, this area has contributed in the order of £3m research funding to Plymouth University, and in the order of 150 mostly peer-reviewed publications; it was key to the School's first ever submission under 2014 to Unit of Assessment 16 (Architecture, Built Environment and Planning). The research expertise in building performance analysis includes areas such as building simulation and monitoring and verification which are currently not directly aligned with the teaching offer. At the same time industry is showing significant interest in these fields, especially in the context of the need to increase energy efficiency and reduce carbon emissions in the built environment, which leads to good career prospects for those who undertake further education in this area.

The subject of High Performance Buildings is not offered by any UK university, yet interest is evidenced by the industries Building Performance Awards as introduced in 2004 (see http://www.cibse.org/Building-Performance-Awards), dedicated publications in the area (http://www.hpbmagazine.org), and emergence of recent books such Design and Construction of High Performance Homes (Trubiano, 2013). Related aspects such as Energy Performance Contracting are currently experiencing rapid growth, with the market size of Energy Service Companies (ESCOs) in the UK estimated at € 400 million in 2010, with a potential to grow to € 1 billion, making this an excellent field to work in.

In the USA High Performance Buildings is offered by some Universities, but is often seen as the equivalent of 'green' or 'sustainable' buildings. In contrast, the Plymouth approach to High Performance Buildings will be a holistic one that includes other dimensions such as 'workload capacity' of the building, as well as socio-cultural and historic.

The course will cover both high-tech and low-tech buildings, new build and retrofit, and will look at performance from the point of view of different stakeholders throughout the building life cycle.

Other distinctive features of the programme include:

- *Professional Accreditation:* The course will be fully accredited by the leading professional body recognised for building services, the Chartered Institution of Building Services Engineers (CIBSE). Dual accreditation will be sought with the Charted Institute of Architectural Technology (CIAT).

- *Inspiring Teaching:* The programme is taught by staff with both an industry and research background. Teaching is also supported by industry professionals and an extensive programme of UK and international visiting speakers.

- *Site visits:* Off campus, students also enrich their learning with industry experience through site visits and international field trips.

- *Research-informed learning*: The academic staff are also researchers, allowing the latest research findings to be delivered directly to the students. The research covers a broad range of specialist areas, including: construction management, building performance analysis, thermography, construction economics, architecture, and urban design.

- *Industry Links:* The department sustains good links with many of the leading construction companies in the UK. Industry professionals play an active role in the programme, by participating in guest lectures, workshops and tutorials. These provide opportunities for work-placements to individual students and future employability opportunities.

- *Real assessments*: The course is designed to prepare students for their future career. The assessments reflect the varied world of work, a mixture of coursework, project work, site visit reports, examinations, and presentations. Students work on industry led group projects with real project briefs and clients, and they benefit from guidance from a panel of industrial advisers, which help them to develop the professional skills and networking necessary to successfully progress in the sector.

5. Relevant QAA Subject Benchmark Group(s)

Master's degree characteristics 2010:

http://www.qaa.ac.uk/en/Publications/Documents/Masters-Degree-Characteristics-2010.pdf

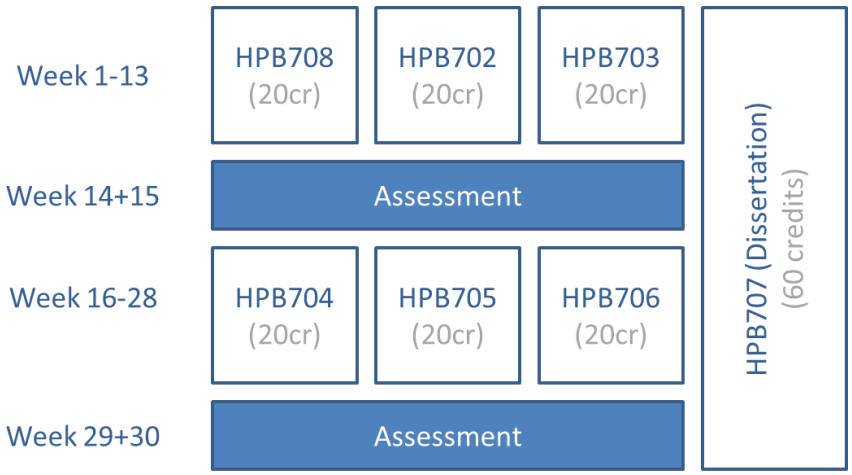
6. Programme Structure

The MSc Programme in High Performance Buildings will have a straightforward structure. It will have 7 modules, for a total of 180 credits; 6 modules will be 20 credit modules, yielding 120 credits in total, while the 7th module will be a research project module that will carry a weight of 60 credits.

Pass requirements for the modules are set at 50%.

See diagrams for overall structure. Detail of the content of these modules is provided on the table following the two diagrams.

Diagram for **full-time mode**:



The normal study mode will be full-time, where all 180 credits are taken in the same year. There also is a part-time mode, with 60 credits taken in year one and 120 credits taken in year two. The part-time mode is operated in such a way that it allows students to join the programme on day release from an existing employment. Upon request, we will consider running the full-time mode to include an intensive summer term, in order to accommodate students who want to do the MSc in one year while on day release. The modules all map to the Plymouth University semesters. Finally,

in order to respond to the complexity of the Covid-19 Pandemic, there is a one-off opportunity for a January start in the year 2021.

Diagram for **part-time mode**:

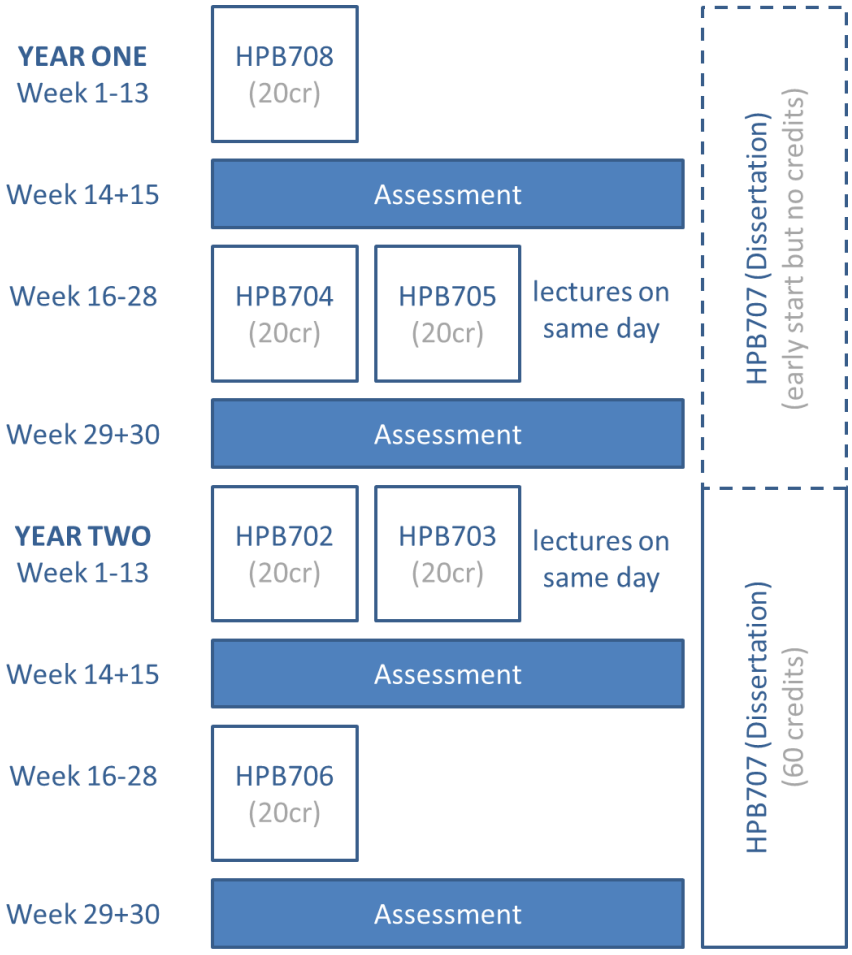


Diagram for optional delivery of **full-time mode** with **intensive summer** term

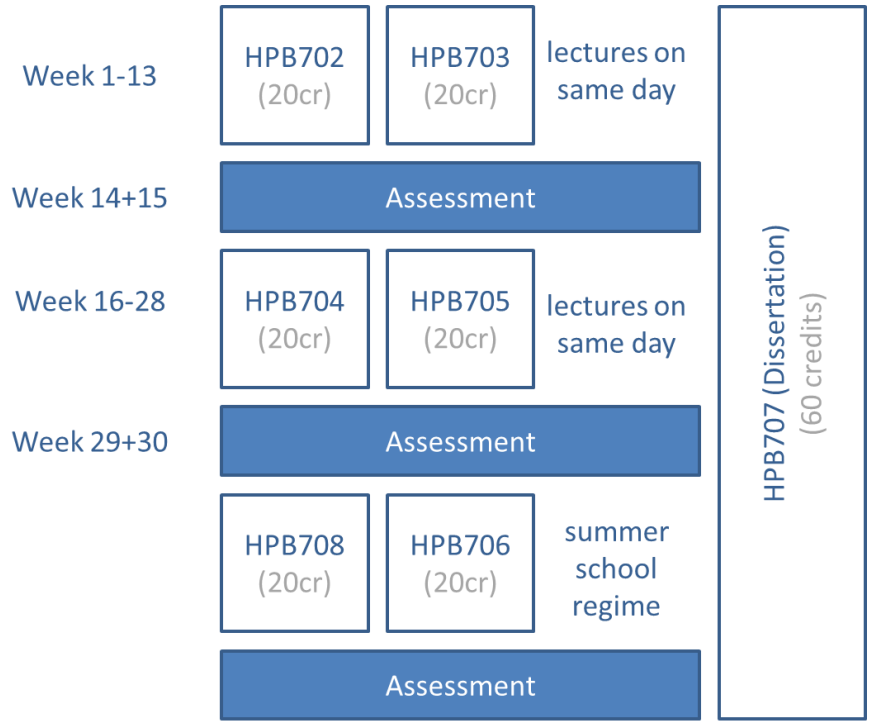
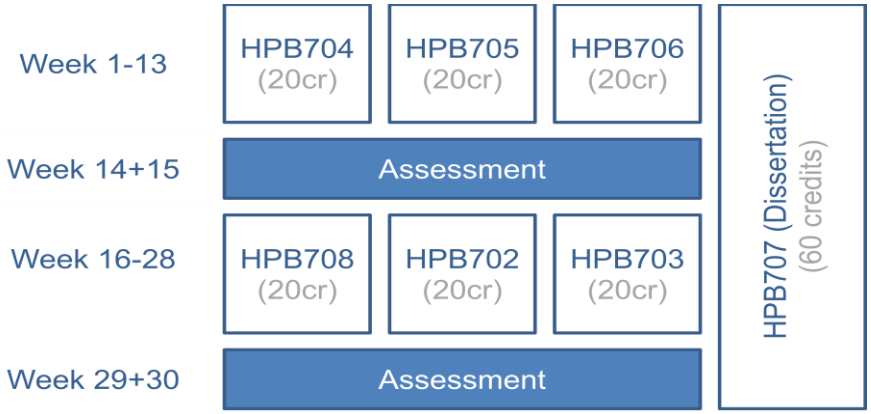


Diagram for January Start in 2021



Module Code	Module Title	Credit	Semester	Status	Assessment
HPB708 (formerly HPB701)	Theory of High Performance Buildings	20	1	Core Compensatable	50% EX 50% CW
HPB702	Emerging Construction Technology	20	1	Core Compensatable	50% EX 50% CW
HPB703	Smart and Intelligent Buildings	20	1	Core Compensatable	50% EX 25% CW, 25%P
HPB704	Advanced Building Performance Simulation	20	2	Core Compensatable	50% EX 25% CW, 25%P
HPB705	Performance Finance and Investment	20	2	Core Compensatable	50% EX 50% CW
HPB706	Performative Architecture	20	2	Core Compensatable	100% CW
HPB707	High Performance Buildings Research Project	60	1 & 2	Core Compensatable	100% CW

7. Programme Aims

The MSc High Performance Buildings is a one-year full time-time programme focussed on building performance. The programme aims to provide students with an opportunity to develop proficiency in the quantification of building performance, and the application of the performance concept throughout the building life cycle.
The programme opens up a new 'technology pathway' route in the School of Architecture, Design and Environment that comprises of a new BSc in Architectural Engineering, the MSc High Performance Buildings, and research degrees in Building Performance Analysis.

Graduates who have completed this programme will have:

- A critical understanding of building performance and the various approaches to measure and quantify this performance;
- Comprehensive knowledge of existing and novel technologies, fabrication and construction methods for buildings.
- Knowledge and understanding of the financial and economic drivers that govern the life cycle of high performance buildings.

- Ability to develop and assess complex building performance indicators.
- Intellectual skills to critically analyse building performance in terms of building requirements, functions and behaviour.
- Ability to analyse data in complex situations, dealing with, amongst others, incomplete or contradictory information.
- Intellectual skills to reflect on building performance in the technical context, but also from a socio-economic, aesthetic or cultural perspective.
- Ability to use building performance simulation tools, and to collect data from existing buildings through monitoring and verification, and post occupancy evaluation.
- Skills to carry out optimization, fault detection and control of building systems.
- Ability to deal with stakeholders involved in building performance.

8. Programme Intended Learning Outcomes

8.1. Knowledge and understanding

On successful completion graduates should have developed:

1) A critical understanding of building performance and the various approaches to measure and quantify this performance.

2) Comprehensive knowledge of existing and novel technologies, fabrication and construction methods for buildings.

3) Knowledge and understanding of the financial and economic drivers that govern the life cycle of high performance buildings

8.2. Cognitive and intellectual skills

On successful completion graduates should have developed:

1) Ability to develop and assess complex building performance indicators.

2) Intellectual skills to critically analyse building performance in terms of building requirements, functions and behaviour.

3) Ability to analyse data in complex situations, dealing with, amongst others, incomplete or contradictory information.

4) Intellectual skills to reflect on building performance in the technical context, but also from a socio-economic, aesthetic or cultural perspective.

8.3. Key and transferable skills

On successful completion graduates should have developed the ability to:

1) Identify individual learning needs and understand the personal responsibility required for further professional education.

2) Apply problem solving skills, professional judgement, and initiative to make appropriate decisions in complex and unpredictable circumstances.

3) Plan, conduct and communicate a detailed programme of research.

8.4. Employment related skills

On successful completion graduates should have developed:

1) Initiative and personal responsibility.

2) Effective communication and collaboration skills.

3) The ability to make decisions made on incomplete information.

4) Career awareness and personal development planning.

8.5. Practical skills

On successful completion graduates should have developed:

1) Ability to use building performance simulation tools, and to collect data from existing buildings through monitoring and verification, and post occupancy evaluation.

2) Skills to carry out optimization, fault detection and control of building systems.

3) Ability to deal with stakeholders involved in building performance.

9. Admissions Criteria, including APCL, APEL and DAS arrangements

The admissions policy and procedures are in place to ensure that applicants have the intellectual ability, motivation and, where appropriate, the professional experience to benefit from, and contribute to, the MSc High Performance Buildings.

The normal minimum qualification is an Upper second-class Bachelor's degree (2.1) from a UK university in engineering, science, mathematics, or a discipline related to building. Other qualifications supplemented with relevant industrial experience will also be considered.

International students require a suitable academic profile as well as an English language score of IELTS 6.5 or equivalent.

10. Progression criteria for Final and Intermediate Awards

Students undertaking the MSc High Performance Buildings much achieve a pass (50%) in all modules. There is no compensation for failed modules.

Where a student has achieved an aggregate of 70%, they will be awarded MSc High Performance Buildings with Distinction.

Where a student has achieved an aggregate of 60%, they will be awarded MSc High Performance Buildings with Merit.

Where a student has passed 120 credits of the programme they will be awarded a Postgraduate Diploma.

Where a student has passed 60 credits of the programme they will be awarded Postgraduate Certificate.

11. Non Standard Regulations

Not applicable.

12. Transitional Arrangements

Not applicable.

Appendices

Programme Specification Mapping (PGT)

MSc HPB ILO #	Programme Intended Learning Outcomes	Module in which LO is assessed
6.1.1.	A critical understanding of building performance and the various approaches to measure and quantify this performance.	HPB708 HPB703 HPB706 HPB707
6.1.2.	Comprehensive knowledge of existing and novel technologies, fabrication and construction methods for buildings.	HPB708 HPB702
6.1.3.	Knowledge and understanding of the financial and economic drivers that govern the life cycle of high performance buildings.	HPB705
6.2.1.	Ability to develop and assess complex building performance indicators.	HPB708 HPB703 HPB704 HPB707
6.2.2.	Intellectual skills to critically analyse building performance in terms of building requirements, functions and behaviour.	HPB708
6.2.3.	Ability to analyse data in complex situations, dealing with, amongst others, incomplete or contradictory information.	HPB708 HPB703 HPB704 HPB706 HPB707
6.2.4.	Intellectual skills to reflect on building performance in the technical context, but also from a socio-economic, aesthetic or cultural perspective.	HPB708 HPB706
6.3.1.	Identify individual learning needs and understand the personal responsibility required for further professional education.	HPB708 HPB706
6.3.2.	Apply problem solving skills, professional judgement, and initiative to make appropriate decisions in complex and unpredictable circumstances.	HPB708 HPB702 HPB703 HPB704 HPB705 HPB706 HPB707
6.3.3.	Plan, conduct and communicate a detailed programme of research.	HPB707
6.4.1.	Initiative and personal responsibility.	HPB708 HPB702 HPB703 HPB704

		HPB705 HPB706 HPB707
6.4.2.	Effective communication and collaboration skills.	HPB708 HPB702 HPB703 HPB704 HPB705 HPB706 HPB707
6.4.3.	The ability to make decisions made on incomplete information.	HPB708 HPB702 HPB703
6.4.4.	Career awareness and personal development planning.	HPB708 HPB702 HPB703 HPB704 HPB705 HPB706 HPB707
6.5.1.	Ability to use building performance simulation tools, and to collect data from existing buildings through monitoring and verification, and post occupancy evaluation.	HPB703 HPB704
6.5.2.	Skills to carry out optimization, fault detection and control of building systems.	HPB703 HPB704
6.5.3.	Ability to deal with stakeholders involved in building performance.	HPB708 HPB702 HPB703 HPB704 HPB705 HPB706 HPB707