London South Bank University

Module Guide

D&MP-PD

Design and Manufacture Project PD

ENG_5_550

School of Engineering

Level 5

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1.   MODULE DETAILS

Module Title:	Design and Manufacture Project PD
Module Level:	5
Module Reference Number:	ENG_5_550
Credit Value:	20
Student Study Hours:	200
Contact Hours:	51
Private Study Hours:	149= 9.5 hours per week
Pre-requisite Learning:	Design Communications and Computing 1
	Design Thinking and Practice 1
	Design Futures and Emerging Technologies
Co-requisite Modules (If applicable):	Digital Visualisation and CAD
Course(s):	BSc Product Design
Year and Semester	2019/20, Semester 2
Module Coordinator:	Andrew Forkes
MC Contact Details (Tel, Email, Room)	0207 815 7693
	forkesa@lsbu.ac.uk
	RoomT701
Teaching Team & Contact Details (If applicable):	
	Ben Clarke
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	RoomT407
	Simon Lunn
Subject Area:	Engineering and Design
Summary of Assessment Method:	100% Coursework

2.   SHORT DESCRIPTION

The module will allow students to apply 'design thinking' techniques and methods coupled with their user centred focus and practical skills, to the design, development and production of a working prototype of a product.

3.   AIMS OF THE MODULE

The aim of this module is to take the student through a complete design cycle from project briefing through to the manufacture of a well-resolved working prototype. The academic level and the time constraints of the module dictate the breadth and depth. It is considered as a 'mini major project' to assist students in aligning themselves for either sandwich industrial placement or direct entry into the final year of study.

The taught programme will develop students' existing knowledge of design theory and methods, and their technical understanding of manufacturing processes such that these may be specified in relation to a particular project. They will learn how to prototype and implement their proposed solutions using appropriate physical and digital manufacturing technologies.

In addition, students are expected to demonstrate the application of their discipline-specific skills through human-centric and interaction based approach to the project.

4. LEARNING OUTCOMES

On completion of the module, students will be able to:

4.1 **Knowledge and understanding**
Science and Mathematics (US):

1. Understand the principles, capabilities and limitations of common industrial manufacturing technologies, and their impact on product design. (US1i) (US1p)

4.2 **Intellectual Skills**
Engineering / Design Analysis (E):

2. Apply a systematic approach to problem solving using appropriate design tools and techniques (D4i) (D2p, E3p)

4.3 Design (D):

3. Demonstrate visual and aesthetic awareness in three-dimensional product design, and generate ideas to solve problems and design new products. (D1i, D8i)

4. Define design problems, write design briefs, and identify constraints including health and safety and risk issues, and intellectual property, using relevant information from technical literature including appropriate codes of practice and industry standards. (D2i, S6i, P4i, P5i) (D2p, S3p, P4p, P5p, P6p, P10p)

4.4 **Transferable Skills**
Economic, legal, social, ethical, and environmental context (S)

5. Knowledge and understanding of the management of the design process. (S4p)

4.5 **Practical skills** Engineering / Design Practice (P):

6. Use relevant materials, equipment, tools and processes to produce functional design prototypes to a high degree of finish.
(P2i) (P2p, D5p)

4.6 Additional General Skills (GS):

Note: The number and letter codes in brackets with 'i' suffix eg (D1i) refer to the Institution of Engineering Designers Engineering Design Specific Learning Outcomes for EC(UK) Accredited Degree Programmes; those with 'p' suffix eg (D1p) refer to the Institution of Engineering Designers Product Design Specific Learning Outcomes for Accredited Degree Programmes.

A full copy of the learning outcomes can be found in the Admin/Key Documents Section of the DMP VLE.

5.   ASSESSMENT OF THE MODULE

The module will be 100% coursework assessed through a single assignment that may integrate with and support other elements of the Design Degree syllabus at LSBU, although it will be assessed and graded within this module.

The assignment will be broken down and assessed through a number of subcomponents.

Submission 1: 10%

- **Visual and technical inspiration is well researched**
- **Brand identity is convincing and coherent**
- **Project brief is well considered and appropriate**
- **Individual Project planner (Gantt chart)**

This Submission addresses Learning outcomes 2, 3, 4 and 5

Submission 2: 20%

- **Exploratory design work is being conducted in 3d as well as 2d**
- **POP model demonstrates core functional principles of the concept**
- **Technical GA (general arrangement) is compliant to BS8888, and presents appropriate detail to begin manufacture of final prototype.**

This Submission addresses Learning outcomes 1, 2, 3, 4, 5, and 6

Submissions 3 and 4 (combined): 70%

- **Final Prototype**: (50% of component mark)
    - Is appropriately finished and detailed, well-constructed, and styled in accordance with the brand identity and values
    - Clearly demonstrates a creative solution to the brief that has considered relevant design aspects such as user needs, function, aesthetics, sustainability, materials, manufacturing, and marketing.

- **Design process**: (25% of component mark)
    - Log book / portfolios are used to good effect throughout the project; they are well organised and provide a comprehensive record of the process
    - Design work is based on user research and technical understanding
    - A variety of activities and methods have been used to develop the project, as appropriate to the project brief
    - A range of different concepts explored and tested/modelled at suitable levels of resolution, leading to continuous improvement and modification of concepts
    - Evidence that logical concept selection processes have been applied to justify the final concept taken forward
    - **[PD only]** Discipline-specific human-centric design techniques have been applied; results have informed the development of the design.

- **Project report**: (25% of component mark)
    - Presents clear and concise record of the design process
    - Demonstrates evidence of project management including PDS and time planning
    - **[PD only]** Presents key results of human-centric design considerations (including packaging design) with evidence as to how they have been applied to the project.
    - Final outcome has been evaluated and reflected upon

Give recommendations for future development that are appropriate and well considered.

This Submission addresses Learning outcomes 1, 2, 3, 4, 5, and 6

Summative assessment will take place through critiques and presentations, at which students must communicate evidence of the thinking and design process they have followed. These presentations may also be supported by written or presentation graphic material.

Students should note that not all of the aspects that you are assessed on will be specifically taught within this module. You are expected to integrate and apply the knowledge and skills gained across your design degree course thus far into the project for this module. In particular you are expected, as students of BSc Product Design, to apply an appropriate level of human understanding to your design work. How and what you do to meet this learning outcome is to some degree up to you, and will be dependent upon the direction of your specific design project. You should discuss this with your tutors during tutorials.

Marking scheme

You will receive a grade as feedback for each assessed element of the module. Each element will be given a grade as follows:

Grade	Mark	Description
A	Over 70%	Excellent work all round
B	60% - 69%	Good work: or a mixture of excellent plus average work.
C	50% - 59%	Average work: or a mixture of good and below average.
D	40% - 49%	Below average overall but still a pass.
E	30% - 39%	A fail mark but may be compensated by other elements.
F	Below 30%	A fail mark that is normally unable to be compensated by other elements.
X	0%	Opted out of element, exempt from element, or handed work in after final deadline.

In order to pass this module students must attain at least 30% in all of the subcomponent assessment points, and an aggregate mark of at least 40% overall.

Work submission
Normally the work will be submitted digitally or/and printed (as required in the brief) in class or at the Faculty Office. Students are responsible to verify if the data is actually stored in any media you have used to submit the assignments.
If you hand in your work in a memory stick, staff are not responsible for loss or damage of any device.
Please note that assignments submitted electronically must be through Moodle only – work will NOT be accepted by email.

Naming work: please label all work including sketches and your log book

Your name:
Your course:
Student number:
Module:

Late submissions
Students are expected to submit the assignments on dates specified within the project brief, after that submissions will be considered a late submission on the upcoming 2 weeks and your mark will be capped at pass mark (40%); after those two weeks the work will be marked zero. A student who is unable to submit the work within the deadline must inform the module leader and Course/Programme Director of the non-submission in advance; s/he may then make a claim for extenuating circumstances. (Please check **London South Bank University Academic Regulations 2019/2020**).
https://www.lsbu.ac.uk/__data/assets/pdf_file/0008/84347/academic-regulations.pdf

6. FEEDBACK

You will receive verbal feedback during the individual and group tutorials and written feedback/transcripts of audio feedback after assessment points. This will normally be given to you within 10-15 working days after the submission of an assignment. (excluding university/staff holiday periods or staff that work fractional posts)

Please note: – *it is every student's responsibility to listen to and take notes during verbal feedback sessions and to read written feedback. In all cases it is individual student's responsibility to respond positively to and act on feedback.*

Formative Feedback is given during impromptu conversations, tutorials, telephone conversations and emails, it can also be drawn or demonstrated (especially in design) this is different to summative feedback and assignment marks which indicate how well you have done against the learning outcomes at the end of the module.

Summative Feedback will normally be given to students **15 working days** after the final submission of an assignment or as advised by their module leader. This feedback generally takes the form of grades and verbal/written commentary on the academics' gauge of your performance.

Please note: *As you may be aware, the design teaching team strive to give feedback well within that time.*

General feedback, applying to all students, will also be placed on the module VLE site within **15 working days**. This generally happens after a critique or review session.

7. INTRODUCTION TO STUDYING THE MODULE

7.1 Overview of the Main Content

This module gives you the chance to demonstrate and apply your skills as a designer to a project at a deeper level than you have yet had the opportunity to do. The project may be described as the 'mini-major project' in the sense that the structure and process that you will follow is comparable to what you will be doing in the final year of the course. It has been developed specifically to prepare you either for employment in a work placement of for direct entry into the final year.

To support this, the taught content is designed to supplement and round off your existing design skills such that you can execute a holistic approach to a complete design project cycle.

Indicative content

Revision of creativity techniques and concept selection methods
Design methods and theory – common design process models.
Design conceptualisation to a structured brief
Design, development and experimentation via rigs models and technology POP (proof of principle) models
Development of design detailing and interaction.
Intellectual property issues in product design
Introduction to project management techniques, Gantt charts
Brand analysis and generation
Product design specifications
Designing against ingress protection
Prototype testing following British, EU, and ISO standards
Materials selection, both technical and emotive
Production processes: Overview and classification of conventional production processes for products from metallic, polymeric and other materials:
Project specific feedback on the following production processes.
Design for casting, forging, sheet metal forming,
Design for polymers, machining:
Design for welding, adhesives and other fabrication methods.
Computer-based production processes for bespoke, batch and mass production/customisation:
Rapid prototyping/digital manufacturing systems.
Design for assembly: one-off, batch and mass production: automated and hand assembly.
Production of a working prototype
Production of 1:1 General Arrangement Drawings to British standard 8888
Design testing and evaluation methods

Case studies and examples will be demonstrated where appropriate using physical products and effects as examples.

7.2   Overview of Types of Classes
There will be a mix of:
Briefings, discussions, lectures, tutorials and seminars.
Group and individual working,
Experimentation with materials, processes and technology
Brand analysis and creation
External visits (retailers, exhibitions, galleries, industry as appropriate and if possible)
Workshop making classes and presentations.
Visiting lecturers from industry (pending availability)

7.3   Importance of Student Self-Managed Learning Time

You should expect to spend a further **128 hours of individual study time** on this module. This equates to nearly **9.5 hours per week** *in addition to the academic led classes*. Students are expected to devote additional self-study hours in order excel in the stated outcomes of this unit.

Well-conceived design work is achieved by gathering feedback from the real product, rigs and prototypes – how they behave when used, how users react to them, and so on. You gain this sort of knowledge in what is called a tacit sense – no amount of writing something down or showing you a video will explain how it feels. Much of design, using technology and dealings with our response to things is at this level – subliminal! Time, experience, and critical reflection are needed and the more of these that you can put to this module the better equipped you will be to be a designer. This projects are intended to improve your time management skills for the major project in your final year.

Please Note: *Students are expected to devote additional self-study hours in order excel in the stated outcomes of this module.*

7.4   Employability

The discipline of Product Design is constantly evolving and highly competitive. Your ticket to employment on placements and as a graduate in industry is your portfolio and the work that you have in it. This module offers you the opportunity to showcase the extent of your skills so far; certainly the work produced by students on previous incarnations of this module has directly led to their employment on placement jobs.

In addition to your design skills, your will need to develop good interpersonal skills, passion and the ability to adapt.

7.5   Attendance

Attendance to tutorials, lectures, and submission points is compulsory and students will be penalised for lateness and/or failure to present and submit work. Each project submission point should be treated as an examination. There is a significant amount of self-managed content expected on this project and students are expected to make maximum use of the LSBU workshop facilities. Please make sure you check LSBU Student Attendance monitoring at http://www.lsbu.ac.uk/sdu/5min/samstud/

If you are absent for any reason from teaching sessions it is courteous and your responsibility to email the module leader and course director explaining why, in addition all absences from class should be Cc'd to attendanceTBSA@lsbu.ac.uk

8.   THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

The detailed programme and the project brief will be supplied in hard copy during classes and a back up copy (which may be revised if the schedule has to change) will be posted in the module administration section of the Design and Manufacture Project VLE website.

Please note: *Students will be given schedule content to assist in building their personal project planner (Gantt Chart)*

9.   STUDENT EVALUATION

The programme of teaching and assessment has undergone a continual process of improvement over the past few years, based on feedback from the students both in class and through module evaluation questionnaires and reflection from the teaching team. Previous student evaluations were highly positive, scoring over 90% positive in all of the key categories of the module evaluation questionnaire. Comments included:

"Covers key aspects of design and what is used in industry. Good Projects"
"One of my favourite modules. I loved the varied nature of the course and helpful feedback from the course leaders; very constructive"
Being able to make stuff!! And understand some materials and manufacturing processes
"Good module, learnt a lot. Enjoyed this module the most"
"The range of feedback between all lecturers was varied and very helpful"
"Good understanding in manufacturing and design processes"

You will have the opportunity to provide feedback on improvements to the module by speaking to the module coordinator or teaching team during the sessions, during course board forums and

formally through module evaluation questionnaires. Please communicate any issues to the module coordinator in the first instance.

10. LEARNING RESOURCES

10.1 Core Materials

Tim Brown. *Change by design* Collins Business 2009

Tom Kelly. *The art of innovation* A Currency Book/Doubleday 2001

Rob Thompson *Manufacturing Processes for Design Professionals*. Thames & Hudson 2007

Lesko, Jim. *Industrial Design - Materials and Manufacturing* John Wiley 1999

Lindbeck, J R. *Product Design and manufacture* Prentice Hall 1995

Ulrich, Karl T and Eppinger, Steven D. *Product Design and Development* McGraw-Hill International. 1996

Kalpakjian S and Schmid SR
Manufacturing Engineering and Technology, 5th Ed. Pearson-Prentice Hall 2006

Ashby, M. Johnson, K *Materials and Design 1 (second edition)* Butterworth Heinemann

Ashby, M. Johnson, K *Materials and Design 2 (second edition)* Butterworth Heinemann

M Bone Johnson, K *I Miss My Pencil*. Chronicle Books 2009

Branko Lukic, Barry M. Katz, Bill Moggridge. *Nonobject.* MIT Press 2011

Please note: *In addition to the books on the list, students will need to research the following Standards and implement their findings into their work:*

BS/EN 8888
BS EN ISO 5459:2011

10.2 Optional Materials

Benyus Janine. *Biomicicry- innovation inspired by nature* Perinial/harper collins 1997

Scott Doorley & Scott Witthoft *Make space* Wiley 2012

Bill Moggridge. *Design interactions.* MIT Press **2006**

Bill Moggridge. *Designing media*. MIT Press**. 2010**

Silvia Katz. *Classic plastics* Thames and Hudson 1984

Lidwell, William. *Universal Principles of Design* Rockport Publishers 2003

Alan Pipes *Drawing for Designers* Laurence king publishing 2007

Burrows, Andrew. *Everyday engineering* IDEO 2007

Lefteri, Chris. *Plastic: Materials for Inspirational Design* Rotovision 2003

Lefteri, Chris. *Making it* (second edition) Laurence king publishing 2012

NOTES

The above book list is intended to be a powerful resource for design students, so please make sure that you investigate them, the teaching team will bring copies to classes to whet your appetite.

Please remember to keep all PPE handy in your lockers as we have workshop related classes in this module.