Summary

Topic 3 - Modelling

Subject	Year	Start date	Duration
Design Technology	IB1	Week 1, September	4 weeks 12 hours

Course Part

Description

The areas of study within this topic are:

- Conceptual modelling
- Graphical modelling
- Physical modelling
- Computer-aided design (CAD)
- Rapid prototyping

Inquiry & Purpose

Inquiry / Higher Order Questions

Type	Inquiry Questions
Skills-based	How can modelling be used to test, share and evaluate design ideas?

Curriculum

Aims

Enable students, through the overarching theme of the nature of design, to develop:

A sense of curiosity as they acquire the skills necessary for independent and lifelong learning and action through inquiry into the technological world around them

An ability to understand and express ideas confidently and creatively using a variety of communication techniques through collaboration with others

Objectives

Demonstrate knowledge and understanding of

design methodology and technology

methods of communicating and presenting technological information

Demonstrate the appropriate research, experimentation, modelling and personal skills necessary to carry out

innovative, insightful, ethical and effective designing

Apply and use

design methodology and technology

methods of communicating and presenting technological information

Syllabus Content

Core

3. Modelling

3.1 Conceptual modelling

The role of conceptual modelling in design

Conceptual modelling tools and skills

3.2 Graphical modelling

2D and 3D graphical models

Perspective, projection and scale drawings

Sketching versus formal drawing techniques

Part and assembly drawings

3.3 Physical modelling

Scale models

Aesthetic models

Mock-ups

Prototypes

Instrumented models

3.4 Computer-aided design (CAD)

Types of CAD software

Surface and solid models

Data modelling including statistical modelling

Virtual prototyping

Bottom-up and top-down modelling

Digital humans: motion capture, haptic technology, virtual reality (VR), and animation

Finite element analysis (FEA)

3.5 Rapid prototyping

Stereolithography

Laminated object manufacturing (LOM)

Fused deposition modelling (FDM)

Selective laser sintering (SLS)

Concepts

- The role of conceptual modelling in design
- Conceptual modelling tools and skills
- 2D and 3D graphical models
- Perspective, projection and scale drawings
- Sketching versus formal drawing techniques
- Part and assembly drawings
- Scale models
- Aesthetic models
- Mock-ups
- Prototypes
- Instrumented models
- Types of CAD software
- Surface and solid models
- Data modelling including statistical modelling
- Virtual prototyping
- Bottom-up and top-down modelling
- Digital humans: motion capture, haptic technology, virtual reality (VR), and animation
- Finite element analysis (FEA)
- Stereolithography
- Laminated object manufacturing (LOM)
- Fused deposition modelling (FDM)
- Selective laser sintering (SLS)

ATL Skills

Approaches to Learning

Communication

- In this unit, we will

ask students to explain their understanding of a text or idea to each other

encourage all students to contribute to discussions

Developing IB Learners

Learner Profile

Inquirers

Knowledgeable

Open-minded

Assessment

Assessment criteria

SL Criteria
External Assessment

Paper 2

A: Data-based and short-answer questions on the core material

B: Extended-response question on the core material

HL Criteria
External Assessment

Paper 2

A: Data-based and short-answer questions on the core material

B: Extended-response question on the core material

Description