

Hong Kong Diploma of Secondary Education Examination 2018

DESIGN AND APPLIED TECHNOLOGY

SBA Project – Suggested Titles

Candidates are required to choose ONE project from the following:

Project 1: A piece/set of creative and versatile public furniture that is user-oriented

Situation:

Public places, like urban parks, pedestrianized plazas, or waterfront parks, provide the general public with spaces and facilities for different activities. People can spend their time resting, eating, doing physical exercise, and having social encounters while using public furniture designed for a range of needs.

Design Problem:

Choose a public space and design a creative and versatile piece/set of public furniture that is user-oriented and serves different function(s). Users of the public furniture are allowed to change one or more characteristics of the furniture to suit their individual needs. These characteristics include, but are not limited to, function, appearance and arrangement.

Part 1 Research, investigation and data collection (10% of subject mark)

(a) Problem identification – exploring problems and clarifying tasks

- Investigate and critically analyse existing public furniture in Hong Kong, in terms of location, function, appearance, arrangement, structure, safety, material, surface finish, manufacture and cost.
- Identify potential users and observe their behaviour when using public furniture in public spaces.
- Conduct a user survey to collect data from the potential users to find out their preferences on using public furniture.
- Based on the information collected from your investigation and survey, prepare a design brief and a list of specifications. The specifications should be justified against which ideas will be evaluated and the final design solution assessed.

(b) Research in technology

- Conduct a case study or technological exploration related to the design problem, e.g. a study on how to protect public furniture against theft, a study on public furniture materials for easy maintenance, or a study on ergonomic considerations for public furniture.

(c) Exploring preliminary design ideas

- Use annotated sketches/prototypes/computer 3D models to generate three different initial ideas with detailed notes showing the location, function, appearance, arrangement, structure, safety, security, material, surface finish and manufacture of the proposed public furniture.

Part 2 Design and make (30% of subject mark)

(a) Development and refinement of the design ideas

- Use annotated sketches/prototypes/computer 3D models to show the development and refinement of the design ideas, with considerations on feasibility and alternative solutions.
- Use suitable media and format (engineering drawing/CAD) to produce assembly and working drawings (orthographic/pictorial/exploded view) of the proposed final solution, along with a parts list. The assembly and working drawings must have main measurements and constructional details.

(b) Realisation of the final design solution

- Apply and demonstrate appropriate technology, resources, planning and management skills to produce a physical/virtual 3D model of the proposed public furniture showing forms and shapes before and after changes by using computer animation or other graphical methods.
- Produce a user guide or set-up instructions to be displayed at an eye-catching location on or near the public furniture.
- Prepare a time schedule that lists in each stage the time and resources required for the implementation of the final design solution.

(c) Testing and evaluation of the final design solution

- Formulate an evaluation plan, test and evaluate the effectiveness of the final design solution against the requirements of the design brief. Identify the strengths of the final solution and explain how it could be improved explicitly.

(d) Overall presentation

- Use an A4 or A3 size design folder to present the documents and drawings related to the project, including project proposal, management, development, realisation and evaluation processes and results.
- Use appropriate communication, modelling and information-processing skills, and technical terminology to present research findings and design ideas.

Project 2: A universal public drinking fountain

Situation:

Drinking fountains are commonly found in public amenities/facilities such as schools, airports, hospitals, sports complexes and parks. Some drinking fountains are designed with two heights to cater for people with different needs.

Design Problem:

Design a height-adjustable drinking fountain at a public amenity/facility of your choice to serve adults, children, elderly, wheelchair users, and persons with different physical disabilities. The design of the drinking fountain should allow users to move the spout to his/her desired height easily and drink comfortably.

Part 1 Research, investigation and data collection (10% of subject mark)

(a) Problem identification – exploring problems and clarifying tasks

- Investigate and critically analyse existing drinking fountains in Hong Kong, in terms of location, function, appearance, structure, safety, hygiene, material, surface finish, manufacture and cost.
- Identify potential users and observe their behaviours when drinking from a fountain.
- Conduct a user survey to collect information from the potential users about their views on the design of drinking fountains.
- Based on information collected from your investigation and the survey, prepare a design brief and a list of specifications. The specifications should be justified against which ideas will be evaluated and the final design solution assessed.

(b) Research in technology

- Conduct a case study or technological exploration related to the design problem, e.g. the optimum angle of water stream coming out from the spout of a drinking fountain, and methods of adjusting the height of the spout.

(c) Exploring preliminary design ideas

- Use annotated sketches/prototypes/computer 3D models to generate three different initial ideas with detailed notes showing location, function, appearance, structure, safety, hygiene, material, surface finish and manufacture of the proposed drinking fountain.

Part 2 Design and make (30% of subject mark)

(a) Development and refinement of the design ideas

- Use annotated sketches/prototypes/computer 3D models to show the development and refinement of the design ideas, with considerations on feasibility and alternative solutions.
- Use suitable media and format (engineering drawing/CAD) to produce assembly and working drawings (orthographic/pictorial/exploded view) of the proposed final solution, along with a parts list. The assembly and working drawings must have main measurements and constructional details.

(b) Realisation of the final design solution

- Apply and demonstrate appropriate technology, resources, planning and management skills to produce a physical/virtual 3D model of the proposed drinking fountain by using computer animation or other graphical methods.
- Produce a user guide to be displayed at an eye-catching location on or near the drinking fountain.
- Prepare a time schedule that lists in each stage the time and resources required for the implementation of the final design solution.

(c) Testing and evaluation of the final design solution

- Formulate an evaluation plan, test and evaluate the effectiveness of the final design solution against the requirements of the design brief. Identify the strengths of the final solution and explain how it could be improved explicitly.

(d) Overall presentation

- Use an A4 or A3 size design folder to present the documents and drawings related to the project, including project proposal, management, development, realisation and evaluation processes and results.
- Use appropriate communication, modelling and information-processing skills, and technical terminology to present research findings and design ideas.

Project 3: A robotic game for your school's fun fair

Situation:

Your school is going to organise a Fun Fair this summer in the open playground. You are a member of the Design and Applied Technology Club and are tasked with designing a robotic game in the Club's game booth for the Fair. The game aims to stimulate junior secondary students' interests in Design and Technology through fun activities.

Design Problem:

Design and make a robotic device capable of moving a number of small objects from one table to another within a certain time limit (say 5 minutes). There should be a gap of at least 500 mm between the two tables. In addition, the game should be fitted with associated game props, a timer and a scoring device used for recording the number of small objects moved by the game participants within the time limit. The main body of the robotic device should be self-devised and made from raw materials, and should not be directly built from commercially available robotic kits. However, commercially available mechanical components, control components, and programming devices are permitted.

Part 1 Research, investigation and data collection (10% of subject mark)

(a) Problem identification – exploring problems and clarifying tasks

- Investigate and critically analyse robotic/control devices used in daily life and the workplace, in terms of basic configurations, mechanical movements, functions and basic components.
- Conduct a survey on junior secondary students regarding their preferences on mechanised games.
- Based on information collected from your investigation and survey, prepare a design brief and a list of specifications. The specifications should be justified against which ideas will be evaluated and the final design solution assessed.

(b) Research in technology

- Conduct a case study or technological exploration related to the design problem, e.g. a case study on pick-up devices/grippers deployed by robots, and a study on the design of mechanised games involving the application of technological principles.

(c) Exploring preliminary design ideas

- Use annotated sketches/prototypes/computer 3D models to generate three different initial ideas with detailed notes showing function, appearance, structure, safety, material, surface finish and manufacture of the proposed robotic device, associated game props, the timer and the scoring device.

Part 2 Design and make (30% of subject mark)

(a) Development and refinement of the design ideas

- Use annotated sketches/prototypes/computer 3D models to show the development and refinement of the design ideas, with considerations on feasibility and alternative solutions.
- Use suitable media and format (engineering drawing/CAD) to produce assembly and working drawings (orthographic/pictorial/exploded view) of the proposed final solution, along with a parts list. The assembly and working drawings must have main measurements and constructional details.

(b) Realisation of the final design solution

- Apply and demonstrate appropriate technology, resources, planning and management skills to produce a working physical model of the proposed robotic device, associated game props, the timer and the scoring device.
- Produce an illustrated description of the game to be displayed at the game booth in the Fun Fair.
- Prepare a time schedule that lists in each stage the time and resources required for the implementation of the final design solution.

(c) Testing and evaluation of the final design solution

- Formulate an evaluation plan, test and evaluate the effectiveness of the final design solution against the requirements of the design brief. Identify the strengths of the final solution and explain how it could be improved explicitly.

(d) Overall presentation

- Use an A4 or A3 size design folder to present the documents and drawings related to the project, including project proposal, management, development, realisation and evaluation processes and results.
- Use appropriate communication, modelling and information-processing skills, and technical terminology to present research findings and design ideas.

Remarks: The HKDSE Examination Regulations stipulate that a candidate may be liable to disqualification from part or the whole of the Examination or suffer a mark or grade penalty for breaching the regulations. For details, please refer to the SBA Teachers' Handbook for Design and Applied Technology:

http://www.hkeaa.edu.hk/en/sba/sub_info_sba/dse_subject.html?10