La Salle College

D&T/DAT

Course Outline

2024-2025

1. Aims & Objectives

- To prepare students' with required skills for the ever growing technology
- To develop practical skills, creativity, and problem-solving abilities.
- To foster understanding on the impact of technology to communities.

2. Course Outlines

Form	Knowledge Context	Modules	Learning Elements	Learning objectives
F. 1	Materials and Structures	(K3) Materials and Resources	• Basic understanding of materials • Materials characteristics	• Understand the importance of materials and resources in the design process
		(K4) Structures and Mechanisms	• Basic concepts of structures and mechanisms	• Develop technological thinking to design problems
	Operations and Manufacturing	(K5) Tools and Equipment	• Safety • Basic hand tools • Basic measuring tools	• Manage the resources and processes required to realise their design solutions
		(K6) Production Process	• Basic concepts of structures and mechanisms • Drafting skills • Designing • Use of different materials • Making involving structures and mechanisms • 3D modelling by CAD	• Acquire basic design concepts and skills • Manage the resource required to realise their design solutions • Understand the applications of mechanisms
	Systems and Control	(K8) Concepts of Systems	• Basic concepts of systems	• Understand the concepts of systems
		(K9) Applications of Systems	• Basic concepts of applications of systems	• Understand the applications and implications of both micro and macro systems
	Materials and Structures	(E2) Material Processing	• Processing of materials – removal, forming, joining and finishing	• Application of common materials processing methods to implement design solutions in school settings
F. 2	Materials and Structures	(K3) Materials and Resources	• Properties and testing of materials	• Make use of appropriate materials and resources in the design process
		(K4) Structures and Mechanisms	• Simple properties of structures and movement • Different structure design for various needs	• Understand the applications of structures and movement in design
	Operations and Manufacturing	(K5) Tools and Equipment	• Safe use of tools and equipment • Appropriate choice and use of tools, equipment and machines for realisation of design solution	• Manage the resources and processes required to realise their design solutions
		(K6) Production Process	• Design process • Design consideration • Factors and constraints in choosing production process	• Understand design process • Manage the resource required to realise their design solutions • Understand the applications and implications of systems
	Systems and Control	(K8) Concepts of Systems	• Factors and constraints in choosing production process	• Understand the concepts of systems
		(K9) Applications of Systems	• Mechanical, electrical, electronic and pneumatic control systems	• Understand the applications and implications of both micro and macro systems
	Materials and Structures	(E2) Material Processing	• Cutting, forming, jointing and finishing • Appropriate choice and use of materials process	• Application of common materials processing methods to implement design solutions in school settings
	Operations and Manufacturing	(E3) Project Management	• Planning and organising work in step or procedures	• Manage the resources and processes for realisation

Form	Strand	Topic	Outcome
F. 4	**Strand 1** Design and Innovation	**Design in practice** • Design fundamentals • Design process • Creativity in design • Project management and teamwork • Roles of designers and engineers	1. Interpret design elements and the beauty of objects 2. Utilise design tools, materials, and information 3. Explain ideas and stages of design development 4. Apply creative thinking techniques to generate new ideas 5. Identify the needs of users and customers 6. Collect product information 7. Make a critical assessment of design and production activities 8. Perform cost benefit assessment in product development 9. Understand the roles of designers and engineers at work
		Design considerations • Design brief and specifications • Solving design problems • Human and environmental factors • Product standards • Design evaluation	10. Specify design requirements 11. Adopt a holistic design approach to solve problems 12. Take human and environmental factors into consideration in the design process 13. Appreciate the international standards of materials and products 14. Evaluate designs according to design briefs, criteria and specifications
		Design and communication • Project presentation and report • Visual representation • Physical, graphical, mathematical, and computer modelling	15. Present design concept with clarity 16. Select and use appropriate communication techniques 17. Conduct presentations in 2D, 3D and multimedia
	Strand 2 Technological Principles	**Nature of technology** • Innovation and technology • Energy and energy resources • Materials and standard components	18. Understand the nature of technology 19. Understand the systems of energy sources and natural resources 20. Understand energy consumption in the operation of products and its impact on design 21. Understand the properties of commonly used materials
		Production process • Health and industrial safety • Tools, equipment and machineries • Manufacturing systems	22. Consider safety precautions in the workplace 23. Select and use appropriate tools and equipment 24. Execute appropriate fabrication processes 25. Understand different manufacturing systems
		Systems and control • Input-ProcessOutput • Logic gates • Mechanical systems • Physical structure • Basic electronics	26. Understand various forms of system and control 27. Illustrate control systems with block diagrams 28. Interpret truth tables for simple logic gates 29. Apply knowledge/ concepts of mechanics in design, fabrication and control of systems 30. Understand the nature of forces and stability of structures 31. Understand the basic principles of electronic systems
	Strand 3 Value and Impact	**Values in technology and design** • The changing roles of the designers and engineers in society • Intellectual property • Product evaluation • Environmental responsibility • Appropriate technology	32. Identify the impact and value of design 33. Understand the value of intellectual property 34. Analyse and evaluate manufactured products 35. Consider the environmental issues 36. Understand the needs of resource conservation
		Historical and cultural influences • Evolution of craft and design • Design and culture • New technology	37. Understand the development of craft and production technology 38. Understand the impact of design on culture 39. Understand the impact of new technologies on the quality of life
		Entrepreneurship and enterprise • Competitive edge of Hong Kong • Design to meet market aspirations • Design strategies	40. Understand Hong Kong's small and medium-sized enterprises and their competitiveness 41. Understand the essentials of corporate strategy and business strategy 42. Propose business and marketing plans 43. Manage a product design project 44. Demonstrate commitment in fulfilling the wants of consumers and providing value-added products

Form	Module	Topic	Outcome
F. 5	**Module 2** Creative Digital Media	**Media literacy** • Communication via digital media • Digital media products and related business • Social, economic and technological factors	1. Understand various modes and stages of communication in different contexts 2. Identify the features of communication via digital media 3. Compare different digital media products in the local and global markets 4. Evaluate the pros and cons of a media-rich society in terms of social (including cultural and historical), economic and technological factors
		Digital media design • Conceptual development • General rules of visual composition • Basic principles of communication design in creating digital media	5. Describe the relationship among text, sounds, static and dynamic images/graphics and animation/video in communication via digital media 6. Create ideas for conveying messages and information efficiently and effectively/meaningfully 7. Apply the general rules of visual composition in digital media design 8. Evaluate the usability, readability and interactivity of different digital media products by referring to the basic principles of communication design
		Digital media production • Project planning and idea presentation methods • Manipulation of visual and audio equipment • Application software	9. Identify the need for digital media production 10.Outline and distinguish different building blocks in digital media production 11.Manage the activities of digital media production 12.Carry out a simple digital media production with the use of appropriate visual and audio equipment and application software
	Module 3 Design Implementation and Material Processing	**Materials, components and systems** • Properties and choice of materials • Materials and structures • Mechanisms • New materials	1. Understand that properties and working characteristics influence the choice of materials and components 2. Understand the strength of material and design appropriate structures in a system 3. Apply mechanisms for control systems 4. Understand the use of new materials
		Processing and manufacturing • Manufacturing processes and techniques • Scale of production • Quality assurance and quality control	5. Select, explain and execute appropriate manufacturing processes and techniques 6. Explain when it is most appropriate to use different scales of production 7. Consider the application of quality control in production
		CAM • Computer numerical control (CNC) and CAM • Basic concepts of Computer Integrated Manufacturing (CIM) and Flexible Manufacturing System (FMS) • The impact of CAM on manufacturing	8. Understand the use of CNC machines and CAM systems in industry 9. Understand CIM and FMS, and their wider application in industry

	Module 5 Visualisation and Computer-aided Design (CAD) Modelling	**Product visualisation and 3D modelling** • Visual impact of graphics • 3D modelling concepts	1. Apply visual impact to enhance graphics 2. Develop solutions modelled in appropriate materials to convey 3D concepts
		Technical visualisation • Pictorial drawing • Engineering drawing • Standards, conventions, and symbols • Data presentation	3. Apply a wide range of pictorial drawing techniques to communicate design ideas 4. Apply a wide range of engineering drawing techniques to communicate design ideas 5. Apply a wide range of presentation techniques to communicate design ideas and data 6. Understand the use and importance of standard practice, conventions, abbreviations and symbols
		Computer-aided design • 'Virtual' prototypes • Criteria for computer modelling techniques • CAD software • The impact of CAD on the design process	7. Understand how 'virtual' prototypes for visualising design can enhance the product development process 8. Compare and contrast different computer modelling techniques 9. Explain the criteria that enable designers to select appropriate computer modelling techniques 10.Construct models of products with CAD software

3. Assessment Policy

a. Form 1 Assessment Policy

Date	Topic	Requirement	Criteria	Weighting
Term 1				
SEPT	3D CAD and Printing - Memo Clip Holder Design	Submit a sketch of design, a 3D model and a GCODE file	aesthetics, creativity, feasibility, practicality, 3D concepts, CAD techniques	20%
OCT	Free-hand Sketching - isometric drawing	Submit an isometric drawing of product	sketching technique, tidiness, accuracy	10%
OCT	Free-hand Sketching - Interior Design (Room)	Submit a one-point perspective drawing	aesthetics, practicality, originality, sketching technique, tidiness	10%
NOV-DEC	Woodworking - Pen Stand Design	Submit a sketch of design, research materials and a final product	aesthetics, sketching, cutting, joining and finishing skills, material understands, creativity, feasibility, practicality,	35%
NOV-DEC	Knowledge - Worksheets	Submit of short assignments / worksheets	Understanding and application of knowledge - design elements	15%
SEPT-DEC	Attitude & Safety Awareness	The attitude and safety awareness towards projects in Term 1	understanding and application of workshop safety measures, self-discipline, seriousness and participation in L&T activities	10%
Term 2				
JAN-FEB	3D CAD and Multimedia- Furniture Design	Submit a sketch of design, a 3D model and an animation	aesthetics, creativity, feasibility, practicality, 3D concepts, interior design concepts, CAD techniques, multimedia presentation	20%
MAR-MAY	Structural Design - The bridge (Simulation)	Submit a simulation of a bridge under given circumstance	structure concepts, materials, originality, creativity, feasibility	10%
			simulation result	15%
	Structural Design - The bridge (Model Making)	Submit a wooden bridge model and test for the performance	structure concepts, 3D concepts, cutting, joining and finishing skills, creativity, feasibility, practicality, collaboration	10%
			test result	20%
MAR-MAY	Knowledge - Worksheets	Submit of short assignments / worksheets	Understanding and application of knowledge - hand sketches imitation	15%
JAN-MAY	Attitude & Safety Awareness	The attitude and safety awareness towards projects in Term 1	Understanding and application of workshop safety measures, self-discipline, seriousness and participation in L&T activities	10%

b. Form 2 Assessment Policy

Date	Topic	Requirement	Criteria	Weighting
Term 1				
SEPT	Free-hand Sketching - Orthographic Projection	Submit an orthographic drawing of product	sketching technique, tidiness, accuracy	10%
OCT	Free-hand Sketching - Interior Design (Shop)	Submit a two-point perspective drawing	aesthetics, practicality, originality, sketching technique, tidiness	15%
OCT-DEC	Mechanism - Automata	Submit a wooden model of automata	mechanism concepts, complexity, feasibility	20%
			aesthetics, creativity	15%
			cutting, joining and finishing skills	10%
OCT-DEC	Knowledge - Worksheets	Submit of short assignments / worksheets	Understanding and application of knowledge - mechanism	20%
SEPT-DEC	Attitude & Safety Awareness	The attitude and safety awareness towards projects in Term 1	Understanding and application of workshop safety measures, self-discipline, seriousness and participation in L&T activities	10%
Term 2				
FEB-MAR	STEAM Project - La Salle Cares	Realisation of the IoT car	Utilisation of tools and material for realisation	10%
FEB	2D CAD and Laser Cutting- Keychain	Submit a printable vector graphic file	aesthetics, creativity, feasibility, practicality, originality, vector drawing techniques	20%
MAR-MAY	Control of Movement - Mousetrap Car Design	Submit a movable mousetrap car and conduct distance test	Sketching	10%
			cutting, joining and finishing skills, movement concepts, creativity, feasibility, practicality, aesthetics, collaboration	10%
			test result	20%
MAR-MAY	Knowledge - Worksheets	Submit of short assignments / worksheets	Understanding and application of knowledge - creative media	20%
JAN-MAY	Attitude & Safety Awareness	The attitude and safety awareness towards projects in Term 1	Understanding and application of workshop safety measures, self-discipline, seriousness and participation in L&T activities	10%

c. Performance Indicator

Assignments will be marked on a 5-level basis depending on the nature of assignments. and the aggregated average mark will be converted to a Level Indicator which will be shown on students' report cards. Convention and criteria are as follow:

Level	Assessment Criteria
V	● Excellent performance with full coverage of required content. ● Wide & rich collection of relevant information. ● Very high level of skills. ● High standard of presentation. ● Good critical understanding of knowledge. *Notes:* 1. *V** will be awarded to the highest scorer in each class* 2. *V* will be awarded to the 2nd and 3rd top scorers in each class*
IV	● Good performance with good coverage of required content. ● Good collection of relevant information. ● High level of skills. ● Good standard of presentation. ● Good reflective understanding of knowledge.
III	● Satisfactory performance with reasonable coverage of required content. ● Acceptable collection of relevant information. ● Basic level of skills. ● Acceptable standard of presentation. ● Evidence of reflective understanding of knowledge.
II	● Acceptable performance with limited coverage of required content. ● Limited collection of relevant information. ● Preliminary level of skills. ● Preliminary standard of presentation. ● Basic understanding of knowledge with limited reflection.
I	● Unsatisfactory performance and insufficient coverage of required content. ● No collection / collection of irrelevant information. ● Basic skills not demonstrated. ● Poor presentation. ● No evidence of basic understanding of knowledge.

d. Form 4 Assessment Policy

	Type of assessment	Description	Weighting
Continuous Assessment	Drawings, papers and projects	Assignment and in-class exercises of drawings, papers and projects	15%
	Uniform test		5%
Examination			80%

e. Form 5 Assessment Policy

	Type of assessment	Description	Weighting
Continuous Assessment	Drawings and papers	Assignment and in-class exercises of drawings and papers	15%
	Uniform test		5%
Examination			80%

f. Form 6 Assessment Policy

	Type of assessment	Description	Weighting
Continuous Assessment	Drawings and papers	Assignment and in-class exercises of drawings and papers	15%
	Uniform test		5%
Examination			80%