SYLLABUSES
FOR
SECONDARY SCHOOLS

GRAPHICAL COMMUNICATION
(Secondary 1 - 3)

PREPARED BY
THE CURRICULUM DEVELOPMENT COUNCIL
RECOMMENDED FOR USE IN SCHOOLS BY
THE EDUCATION DEPARTMENT
2000
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PREAMBLE

This syllabus is one of a series prepared for use in secondary schools by the Curriculum Development Council, Hong Kong. The Curriculum Development Council, together with its co-ordinating committees and subject committees, is widely representative of the local educational community, membership including heads of schools, lecturers from tertiary institutions and the Hong Kong Institute of Education, officers of the Hong Kong Examinations Authority and those of the Curriculum Development Institute, Advisory Inspectorate and other divisions of the Education Department. The membership of the council also includes parents and employers.

This syllabus is recommended for use in Secondary 1 and 3 by the Education Department. Once the syllabus has been implemented, progress will be monitored by the Advisory Inspectorate and the Curriculum Development Institute of the Education Department. This will enable the Graphical Communication Subject Committee of the Curriculum Development Council to review the syllabus from time to time in the light of classroom experiences.

All comments and suggestions on the syllabus may be sent to:

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(Secondary and Prevocational),
Curriculum Development Institute,
Education Department,
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213, Queen’s Road East,
Wan Chai,
Hong Kong.
INTRODUCTION

The subject aims at equipping students with a wide range of graphical communication methods to communicate effectively with both technical and non-technical personnel. The contents of the syllabus do not limited to technical and engineering elements and a wider context of graphical design elements will be introduced to students. The educational experience provided could help to enhance students’ design and communication skills required in their future living and work.

The subject will be equipped with the necessary drawing facilities available in the drawing rooms. A computer laboratory or an information technology learning centre installed with IT facilities will be erected to support the teaching of the IT contents in the subject.
AIMS

The subject aims at developing in students a range of abilities to communicate ideas using graphical means with both technical and non-technical personnel. Students should be able to use appropriate visual representation methods including technical graphics, design graphics and computer-aided graphics techniques and other presentation methods to interpret and present technical information, design concepts and different forms of information.

OBJECTIVES

Students should be able to demonstrate ability to:

1. visualize and understand the elementary spatial relationships concepts;
2. understand the basic presentation methods, principles and conventions for representing technical information or design concepts;
3. understand and use appropriate graphical methods to communicate information and ideas;
4. use the drawing instruments and supporting facilities including information technology facilities to present the information and ideas;
5. appreciate different styles and methods of visual representation;
6. think laterally, reason progressively and produce creative ideas;
7. develop students’ aesthetic attributes and strengthen their verbal communication skills through the educational experience.
CHARACTERISTICS OF THE SUBJECT

The characteristics of studying “Graphical Communication” at S1-3 Level are as follows:

a) This subject begins from introducing to students various draughting techniques to a range of graphical presentation methods at an elementary level.

b) Students will be communicating or sharing ideas, possible solutions or outcomes to and from their counterparts. They will use a variety of means to convey ideas or concepts including: graphical representation of charts or drawings; construction of models; modern information and communication technologies.

c) Students will be given opportunities to understand the spatial relationships of objects with abstract thinking skills and to present them in an acceptable manner.

d) Graphical communication activities involve a range of information skills so that students can retrieve, gather, process, analyse, interpret and evaluate information from a wide range of resources.

e) Students will be encouraged to exercise imagination, initiative, and flexibility in handling information and concepts. Students’ problem solving skills can be developed in the learning experience including design activities.

f) In addition to the technical and design graphics applied in the context of engineering, architectural and home design environment, learning activities will be arranged for students in a wider context including the community.

g) Studying Graphical Communication can help to develop in students a sense of self initiation and motivation. Students will be given opportunities so that they may face challenges where they have to exercise initiative, perseverance and commitment.

h) Using various presentation methods and media for communication will enable students to communicate more efficiently and more confidently which will enhance in them the sense of appreciation and satisfaction in learning.

i) Activities will be arranged for students to interact with a wide range of personnel from the business, industry, community sectors so that they can work closely and cooperatively with others.
SUGGESTED TIME ALLOCATION

A time allocation of 3 periods (40 minutes per period assumed) per week for an average of 22 teaching weeks over 3 years from Secondary 1-3 is recommended.

<table>
<thead>
<tr>
<th>Area of Study</th>
<th>% of Time</th>
<th>No. of Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Design Graphics</td>
<td>20%</td>
<td>40</td>
</tr>
<tr>
<td>2. Spatial Relationships of Objects</td>
<td>15%</td>
<td>30</td>
</tr>
<tr>
<td>3. Technical Graphics</td>
<td>15%</td>
<td>30</td>
</tr>
<tr>
<td>4. Computer Graphics</td>
<td>20%</td>
<td>40</td>
</tr>
<tr>
<td>5. Presentation Graphics</td>
<td>10%</td>
<td>18</td>
</tr>
<tr>
<td>6. Design and Application</td>
<td>20%</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>198</td>
</tr>
</tbody>
</table>

Teachers may assign theme-based project work on specific area or cross-area topics for students in addition to the drawing practices. The time allocated to the project work could be included within the estimated time allocation.

About 40% of the teaching contents may use information technology facilities to support the teaching and learning activities.
LIST OF MAJOR TOPICS

1. **Design Graphics**
   1.1 Basic Draughting Materials, Instruments and Skills
   1.2 Basic Visual Elements and Visual Principles
   1.3 Sketching
   1.4 Graphic Presentation

2. **Spatial Relationships of Objects**
   2.1 Plane Geometry
   2.2 Solid Geometry
   2.3 Projection Methods

3. **Technical Graphics**
   3.1 Engineering Drawing
   3.2 Electrical Drawing
   3.3 Introduction to Architectural Drawing

4. **Computer Graphics**
   4.1 Clip Arts and Basic Computer Graphics Techniques
   4.2 2D Computer-aided Design (CAD)
   4.3 Introduction to 3D Modelling

5. **Presentation Graphics**
   5.1 Presentation Techniques
   5.2 Computer Presentation Techniques

6. **Design and Application**
   6.1 Design and Communication
   6.2 Design and Application
# TEACHING CONTENTS

<table>
<thead>
<tr>
<th>Topics</th>
<th>Learning Outcomes</th>
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<tbody>
<tr>
<td><strong>1. Design Graphics (20%)</strong></td>
<td>Students are expected to be able to:</td>
</tr>
<tr>
<td>1.1 Basic Draughting Materials, Instruments and Skills</td>
<td>Identify and use various draughting materials and instruments:</td>
</tr>
<tr>
<td></td>
<td>papers(grounds and sizes), cards, folios, sketch books;</td>
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<tr>
<td></td>
<td>pencils(hard, soft and coloured), felt pens, technical pens, crayons;</td>
</tr>
<tr>
<td></td>
<td>brushes and paints;</td>
</tr>
<tr>
<td></td>
<td>dry transfer lettering, textures, tones and colours;</td>
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<tr>
<td></td>
<td>rules, templates and compasses;</td>
</tr>
<tr>
<td></td>
<td>drawing boards and drawing sets.</td>
</tr>
<tr>
<td>1.2 Basic Visual Elements and Visual Principles</td>
<td>Understand and apply basic draughting skills involving:</td>
</tr>
<tr>
<td></td>
<td>illustration methods, colouring, scale, layout.</td>
</tr>
<tr>
<td>1.3 Sketching</td>
<td>Understand and apply in design sketches the:</td>
</tr>
<tr>
<td></td>
<td>Visual Elements</td>
</tr>
<tr>
<td></td>
<td>point, line, shape, plane, form, texture and colour;</td>
</tr>
<tr>
<td></td>
<td>Visual Principles</td>
</tr>
<tr>
<td></td>
<td>function and aesthetics, proportion, balance, harmony and contrast, pattern, movement and rhythm, style.</td>
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<tr>
<td></td>
<td>Draw freehand sketch and illustrate design ideas and artefacts in the form of:</td>
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<tr>
<td></td>
<td>Isometric, perspective and sectional views;</td>
</tr>
</tbody>
</table>
### 1.4 Graphic Presentation

- Sketch simple artefacts in pictorial and orthographic forms.
- Use magnified details and partial views to illustrate details of parts.
- Choose the appropriate sketching processes and illustration methods.
- Understand and apply the basic techniques in graphical presentation using:
  - Shading, illumination, texturing and colouring techniques.
  - Apply elementary technical and artistic lettering techniques to communicate the design ideas.
  - Select suitable layout to present the visual images of the graphics.

### 2. Spatial Relationships of Objects  (15%)

#### 2.1 Plane geometry

- Understand the application and draw the spatial relationships of objects in geometrical plane involving:
  - Lines --
    - Division of straight lines into equal and proportional parts;
  - Shapes --
    - Construction of triangles, quadrilaterals, pentagons, hexagons, octagons and ellipses;
    - Reduction and enlargement of polygons to similar
<table>
<thead>
<tr>
<th>2.2 Solid Geometry</th>
<th>figures with sides or areas in given ratios. Equivalent areas of plane figures; Shapes formed from a combination of circles, tangents and tangential arcs; Illustration of movement -- Construction of the simple loci of reciprocating and rotating link mechanisms up to a maximum of four elements. Understand the application and draw the spatial relationships of objects in geometrical solids involving: Sectioning -- Sectioning of right geometrical solids limited to spheres, circular cylinders and cones, regular prisms and pyramids by vertical, horizontal or inclined cutting planes which are designated by their traces (excluding oblique planes); True shape of sections; Surface development -- Surface development of geometrical solids and their applications in right cones, cylinders, prisms and pyramids.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3 Projection Methods</td>
<td>Understand and use different projection methods for presenting artefacts using: Orthographic projection -- Orthographic representation, by both first-angle and third-angle methods, of solids in various positions relative to the principal planes; Isometric projection --</td>
</tr>
<tr>
<td>3. Technical Graphics  (15%)</td>
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</tbody>
</table>
| 3.1 Engineering Drawing | Understand and draw simple formal drawings (assembly and working drawings) and design graphics involving:

- Knowledge of orthographic projection by first-angle and third-angle methods, and isometric projection;
- Hidden Details;
- Understand the use of elementary standard practice, conventions, abbreviations and machine symbol as used in PD7308 and PD 7307;
- Dimensioning of pictorial views in accordance with PD 7308;
- Use of whole or part/local sections to show machine details.

Apply engineering knowledge involving common component parts and locking devices for producing simple assembly drawings in orthographic or pictorial forms.

3.2 Electrical Drawing | Understand and draw simple formal drawings and design graphics involving:

- Drawing of elementary electrical and electronic circuits;
- Understand the use of standard practice, conventions, abbreviations and electronic symbols as used in PD 7303 to draw simple circuit diagrams.
| 3.3 Introduction to Architectural Drawing | Understand and draw formal drawings and design graphics involving:

Simple interior design drawings;
Understand the use of standard practice, conventions, abbreviations and building symbols as used in PD 7301 to represent common features and fixtures found in home. |
| 4. Computer Graphics (20%) | |
| 4.1 Clip Arts and Basic Computer Graphics Techniques | Use computer software with different clip arts techniques for producing design drawings or printouts.

Apply basic computer graphic techniques including lines, shapes, 3D objects, colours and patterns.

Use computer software to design and produce graphics and artistic printouts such as posters or invitation cards. |
| 4.2 2D Computer-aided Design (CAD) | Use elementary 2D Computer-aided Design (CAD) techniques to produce engineering and electrical drawings involving simple machine parts and electronic devices. |
| 4.3 Introduction to 3D Modelling | Introduce the use of 3D CAD software to produce isometric, orthogonal and assembly drawings. |
| 5. Presentation Graphics (10%) | |
| 5.1 Presentation Techniques | Understand and use signs, symbols or diagrams to represent ideas.

Understand and use statistical graphs, charts and
### 5.2 Computer Presentation Techniques

- Understand and use pictograms to represent data.
- Understand and use flowcharts or progress diagrams to represent activities.
- Understand and use photographs to illustrate component parts or artefacts.
- Understand and use maps or site plans to represent locations.
- Understand and use computer presentation techniques to produce simple texts, charts, diagrams for demonstration and presentation purposes.

### 6. Design and Application (20%)

<table>
<thead>
<tr>
<th>6.1 Design and Communication</th>
<th>Exercise basic design skills for problem solving activities demonstrating the development of ideas.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Communicate and present design ideas by applying various aspects of the design and communication skills learnt at elementary level.</td>
</tr>
<tr>
<td>6.2 Design and Application</td>
<td>Design and produce simple design drawings, folios for solving design problems identified in the home, school or community context.</td>
</tr>
<tr>
<td></td>
<td>Make simple 3D mock-ups or models for visualising design proposals and solutions.</td>
</tr>
</tbody>
</table>

*Note:* Students are expected to acquire the basic graphical presentation and design skills at elementary level in the junior forms.

For those topics starting with “Introduction to ---”, they are the extension topics which serve to enrich the curriculum. Teachers should consider the teaching strategy, the ability and interests of the students before choosing the topics to teach.
GUIDELINES ON THE TEACHING OF
GRAPHICAL COMMUNICATION

Teacher’s Role:

✧ Information and materials provider
  - assist students to obtain and handle the information and materials required for their studies in this subject.
✧ Technical advisor
  - assist students to identity safe and workable approaches to solve problems, e.g. in using instrument and handling materials.
✧ Activity initiator
  - plan and organize relevant teaching and learning activities, which benefit students’ learning in the subject.
✧ Students’ working partner
  - support students’ learning, in particular in the problem solving process by listening to their feedback and sharing their views.
✧ Evaluator
  - help students identify the opportunities and challenges during their problem solving process by evaluating it regularly.

Teaching Strategies:

1. Student-Centred Teaching

Teachers are advised to:

✦ encourage and accept student autonomy and initiative.
✦ use raw data and primary resources along with manipulative, interactive and physical materials.
✦ use cognitive terminology such as “classify”, “analyze” “predict”, “create” and etc.
✦ allow student responses to drive lessons, shift instructional strategies and alter content.
✦ inquire about students’ understandings of concepts before sharing their own understandings of those concepts.
✦ encourage students to engage in dialogue, both with the teacher and one another.
✦ encourage student inquiry by asking thoughtful, open-ended questions and encourage students to ask questions of each other.
✦ seek elaboration of students’ initial responses.
• encourage students in experiences that might engender contradictions to their initial hypotheses and then encourage discussion.
• provide time for students to discover relationships and create metaphors.

2. Teaching Towards Objectives

Teachers are advised to:
• familiarise themselves with the objectives detailed in the syllabus.
• design and conduct teaching and learning activities that facilitate students to achieve the learning objectives in a safe, high standard and scholarly manner.
• emphasize workshop safety.

3. Extra-Curricular Activities

Teachers are advised to:
• design and conduct extra-curricular activities that facilitate students to further expose themselves to the subject, in particular in the real-life situations and career path development at a later stage.

4. Multi-Media Teaching Aids

Teachers are highly encouraged to:
• develop and apply multi-media teaching aids and working models to foster and arouse students’ motivation and learning in the subject.
• use Internet as the teaching and learning resources.
Suggested Teaching Activities:

<table>
<thead>
<tr>
<th>Suggested Teaching Activities</th>
<th>Descriptions</th>
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</table>
| **Drawing practice**         | Objective: Allow students to practise the methods and skills learnt to present and communicate information and ideas.  
Method: Provide environment for students to practise various drawing exercises including the use of information technology facilities. |
| **Design Project**           | Objective: Allow students to further explore and consolidate their skills and understanding of the subject by integrating a pool of ideas.  
Method: Set up project guidelines for students, in particular the management of time, resources and assessment criteria. |
| **Presentation and competition** | Objective: Allow student to communicate the information or solutions of problems in a logical and attractive manner.  
Methods: Organize project exhibition or presentation sessions for students to present their projects by means of project folio or mock-ups. |
| **Group discussion**         | Objective: Allow students to exchange and share their views or findings.  
Method: Arrange a group of students, say three to five to sit together and discuss an agreed topic according to the guidelines given by the teacher. |
| **Case study**               | Objective: Allow students to apply and consolidate their skills and knowledge by examining real-life cases.  
Method: Select relevant cases and set up the guidelines for students to follow. |
| **Didactic teaching**        | Objective: Allow students to grasp small pieces of information directly.  
Method: Present information in a legible and logical manner. |
| **Demonstration**            | Objective: Allow students to understand the procedures and / or precautions of hands-on skills.  
Method: Present the materials in as well-organized and safe manner. |
| **Question and answer** | Objective:  | Allow students to test and reinforce their understanding of the subject. |
| | Method:     | Question-Pause-Answer. Ask well-structured questions in a logical manner. Respond to students’ answers positively. |
| **Research** | Objective:  | Allow students to find out further information inside and / or outside the classroom environment. |
| | Method:     | Provide guidelines to students, in particular the width, depth and time span. |
| **Brainstorming** | Objective:  | Allow students too freely “talk” over the problems. |
| | Method:     | Organize students to sit together and discuss freely with limitations as little as possible. |
| **Visits / Filed observation** | Objective:  | Allow students to acquire the experience and /or knowledge which is normally not available / possible in a classroom environment. |
| | Method:     | Organize students to visit a field or an organization with the guidelines and worksheets by the teacher. |
| **Mentoring** | Objective:  | Provide regular assistance and support to students throughout the problem solving processes. |
| | Method:     | Review students’ progress and share with their views. |
ASSESSMENT

Assessment of students’ performance is indispensable; it is an integral part in the teaching and learning process. Teachers have to measure the progress of their students towards the course aims, both individually and collectively, and to adjust the resources, approaches and strategies adopted in the teaching of Graphical Communication to accomplish the goals effectively.

Assessment activities, which can represent students’ learning in Graphical Communication, may be categorized as follows:

1. **Written tests/examinations**
   When setting written tests/examinations, teachers should focus on thinking rather than possession of information. Furthermore, the assessment criteria of tests/examinations should be clearly defined to the students.

2. **Performance tasks**
   This is an assessment in which students are presented with a problem, either in form of verbal or written instruction, to which pupils respond to it by doing something. The performance tasks can include, e.g. drawing practice, project work and etc.

3. **Project**
   This is a portfolio, which represents students’ continuous learning and their progress over a period of time. Students’ initiative in working the project is very important and therefore the subject area selected must be of some interest to students and relevant to students’ daily life. The assessment criteria and specifications of the project should be made clear to students in advance. The focus of assessment should be on student’s ability to communicate the project effectively with others.

4. **Observation**
   Observation and verbal exchanges can help teachers understand what students have learned and these become an informal way of continuous assessment of students’ learning.

Assessments play an important role in students’ learning because assessment results provide valuable feedback to students and teachers for improvement. Awareness should be given to the design of appropriate assessment instruments for different assessment objectives. Records of students’ assessment should be kept and analysed to see the learning profile of individual students such as the progress of various skills of individual students.
Appendix A

STANDARD DRAWING PRACTICE AND CONVENTIONS

PD 7308 : Engineering Drawing Practice for Schools and Colleges
PD 7307 : Graphical Symbols for Use in Schools and Colleges
PD 7303 : Electrical and Electronic Graphical Symbols for Use in Schools and Colleges
PD 7301: Building Drawing Practice for Schools and Colleges
BS 4058 : Data Processing Flow Chart Symbols, Rules and Conventions
Appendix B

MAJOR SOURCES OF REFERENCE


4. Hong Kong Certificate of Education Examination, Regulations and Syllabuses (1999)- Technical Drawing, Hong Kong Examination Authority, Hong Kong.


Appendix C

USEFUL WEBSITES

1. **Degree of Bachelor of Graphic Design**, University of Canberra, Australia

2. **Digital Graphic Communication Option, B. Soc.Sc.**, HK Baptist University, HK.
   http://www.hkbu.edu.hk/programmes/bssdg.htm

3. **Graphic Communication Standard Grade**, University of Glasgow, Scotland
   http://www.elec.gla.ac.uk/BTECHED/graphics/stdlnout.htm

4. **Communications (Grade 8 to 10)**,
   Province of British Columbia, Ministry of Curriculum Branch, Canada
   http://www.est.gov.bc.ca/curriculum/irps/tech_ed/apf.htm#desp