

Gem-A Gem Diamond Diploma Syllabus

Contents	page
Scheme of assessment	2
Gem Diamond syllabus	3
Further information	5

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Gem-A, The Gemmological Association of Great Britain

27 Greville St
London
EC1N 8TN

www.gem-a.com

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Scheme of assessment

The course will contain coursework and end of course examinations. The course is comprised of two parts the theory and practical. Students need to pass both sections to pass this course:

Title	Mode of assessment	Duration	Weighting
Theory component:*			
Gem Diamond paper 1	Written examination	3 hrs	100%
Practical component:			
Practical endorsement	Coursework	-	Completion required
Gem Diamond practical paper 2	Written examination	3 hrs	100%

**Coursework in the form of assessed coursework which will be computer marked and tutor assessed is scheduled to be introduced from Sept 2010.*

The theory course is broken into four areas of study:

Block GD1 – Introducing, Understanding and Communicating the Physical and Optical Properties of Diamond

Content:

- Section GD1 - History of Diamonds
- Section GD3 - The Nature of Diamonds
- Section GD4 - The Properties of Diamond
- Section GD5 - Colour in Diamond

At the end of Block GD1, students should be able to:

- summarize the history of diamond discoveries worldwide
- recognize, recall and show understanding of the structure of a diamond
- describe the basic structure of an atom and how diamond bonds through covalent bonding
- make, record, sketch and communicate reliable and valid observations of rough diamond crystals
- describe, explain and interpret diamonds properties, phenomena, and optical effects in terms of gemmological principles and concepts, presenting ideas clearly and logically, using specialist vocabulary where appropriate
- demonstrate a knowledge and understanding of diamond types and the colour mechanisms in diamonds
- demonstrate a comprehension of the terms needed to understand texts about the optical properties of diamonds.

Block GD2 - Introducing and Explaining the Diamond Pipeline from Geology to Jewellery

Content:

- Section GD2 - Diamond Origin and Occurrences
- Section GD9 - Mining and Recovery
- Section GD10 - Diamond Manufacture
- Section GD11 - History of Diamond Cuts
- Section GD12 - The Gemstone Pipeline
- Section GD13 - Diamond Grading, Valuation and Diamonds in Jewellery

At the end of Block GD2, students should be able to:

- describe the geological process in relation to diamond origins
- explain how occurrence and locality may affect the mining and recovery of diamonds
- describe the process of manufacturing diamond
- summarize the history of diamond cutting and styles
- describe the process of diamond grading, the systems used and how these grades affect the value of a diamond
- demonstrate and show a knowledge and understanding of the ethical, social, economic, environmental and technological implications of the diamond pipeline.

Block GD3 - Identifying Comparing and Contrasting Diamonds, Synthetics and their Various Treatments

Content:

- Section GD14 - Diamond Simulants
- Section GD6 - Synthetic Gem-Quality Diamond
- Section GD7 - Diamond Treatments
- Section GD8 - Testing Diamonds

At the end of Block GD3, students should be able to:

- recognize, recall and show an understanding of natural, treated and synthetic diamonds
- compare and identify diamond and its simulants
- interpret, explain, evaluate and communicate the results of diamond testing clearly and logically using gemmological knowledge and using appropriate specialist vocabulary.

Practical endorsement

Assessment of students practical work is made by a Gem-A approved practical tutor and moderated externally by Gem-A.

Students need to be able to demonstrate a competence at grading a diamond.

Students need to cover the following areas:

- use of the 10x lens
- clarity grading using a 10x lens

- estimating the colour grade of a stone
- analysing the cut of the stone with the unaided eye and the 10x lens
- identifying clarity treatments with the 10x lens
- distinguishing diamond from its common simulants using observation and 10x lens
- use of the diamond probes for testing diamonds
- recognizing, describing and sketching rough diamond crystals
- use of the carat balance
- use of the gauge to estimate the weight of mounted diamonds.

Gem diamond written examinations

The question papers at the end of the Gem Diamond course have a common format. The theory paper includes questions requiring more extended answers.

- Paper GD1 – Theory examination - 3 hours
- Paper GD2 – Practical examination - 3 hours

Sample papers can be obtained in pdf format from the Gem-A Education office.

Results and grades

There are two components to this course the theory and the practical. Both components receive separate grades.

Grade	% Limits	Result
A*	80 - 100	Pass
B*	60 - 79	Pass
C	40 - 59	Re-sit final exam
D	20 - 39	Re-sit final exam
E	0 - 19	Re-sit course section (including any coursework)

*Students with two or more wrong identifications in section A of the GD2 practical paper can achieve a C grade at highest for the practical component and will be required to re-sit the GD2 practical paper.

A and B are pass grades; C, D and E are fail grades. Students are required to pass both the theory and practical components to pass this course.

Distinctions are awarded to students with A/A grades and no stones wrong in the GD2 practical paper. Merits are awarded to students with an A grade and a high B grade (i.e. with 75% or higher) or higher and who have one or less stones wrong in section A of the GD2 practical paper.

Students are required to sit the practical exam either in the same sitting or prior to the theory

examinations. In order to be eligible for a distinction or award students must sit all their examinations within one year. More than one type of award may be given. See Gem-A's website for further details on this.

Re-sits: Students with a pass grade in the practical will have their practical grade held indefinitely and can re-sit the theory at any time. Students who pass the theory but require a re-sit in the practical component are given two years to re-sit and pass the practical component. After this time both examination components of the course must be re-sat. Following any re-sit, candidates are not eligible for a Distinction, Merit or for any award.

A Gem Diamond Diploma is awarded to qualifying candidates.

Gem Diamond syllabus

This syllabus indicates the possible areas of the subject which can be examined in the Gem Diamond examination.

The maximum level of detail required is indicated in certain parts of the syllabus.

Due to the specialised nature of the Gem Diamond course and the need for accurate and reliable study materials Gem-A provides course notes to guide and assist students through the course and final examinations, however, additional reading around the subject is always recommended. For further information about the course materials available please contact Gem-A.

The specific level and amount of information required in the examination is also indicated by the potential marks printed next to each examination question.

The numbers on this syllabus relate to the relevant course section numbers.

GD1. History of Diamond

- The brief history of discovery and mining developments; diamond localities and their historical significance; mine output and gem output in relative terms (figures are not required).

GD2. Diamond origin and occurrences

- Geological significance of diamond origin, discovery and occurrence. The dynamic geological environment of diamond and its conditions of growth; evidence for origins. Geographical distribution and mine localities in terms of

geological occurrence: primary and secondary occurrence.

GD3. The nature of diamond

- The structure of diamond: chemical bonding and crystalline patterns of carbon atoms; diamond crystal form and habit, growth and etch markings, cleavage, growth planes and 'grain'. Classification of diamond in the cubic crystal system.

GD4. The properties of diamond

- The major physical properties of diamond: the relevant descriptions of the gemmological properties and their practical exploitation. Dispersion and 'fire'; total internal reflection; reflectivity and lustre; brilliance. Directional optical properties: polarization; refraction. Non-optical properties: durability, specific gravity (SG); electrical properties; thermal properties; wettability. Non-optical directional properties: 'grain', cleavage, differential hardness and crystal form in relation to the crystal structure of diamond: their significance in identification and manufacture.

GD5. Colour in diamond

- Description of the importance of crystalline imperfection and diamond type: the mechanism and major influences of imperfections on colour and electrical properties; absorption characteristics. Ultraviolet radiation; fluorescence and phosphorescence.

GD6. Synthetic gem-quality diamond

- Methods, conditions and examples of modern synthesis of gem-quality diamond.

GD7. Diamond treatments

- Examples and mechanisms of various types of production and alteration of body colour including irradiation and heat treatment, high-temperature high-pressure treatment. Surface colour alteration including painting and foiling. Clarity treatments: laser-drilling, KM laser treatment and glass filling of surface-reaching cavities.

GD8. Testing diamonds

- The main laboratory testing tools used to test diamonds, including the DTC screening tools.

GD9. Mining and recovery

- The main methods of modern mining; open-pit and underground mining. Diamond-pipe and alluvial diamond mining including marine mining. Stages of recovery: treatment; concentration and separation.

GD10. Diamond manufacture

- Methods of manufacture. The round brilliant cut: designing the rough, dividing, shaping; faceting and polishing. Sawing planes and polishing grain. Use of lasers and automation.

GD11. History of diamond cuts

- A brief history of the development of cutting. The cuts. New cuts. Quality of cut and ideal proportions for diamond. Proportion measurement.

GD12. The diamond pipeline

- Sizing and shapes of rough. Sorting for quality and colour. The rough diamond market, DTC, conflict diamonds and the Kimberley Process. The polished diamond market. Cutting centres and diamond bourses.

GD13. Diamond grading, valuation and diamonds in jewellery

- The 4 C's colour; clarity; cut and carat weight; the grading systems and the principles of grading. Diamond grading reports. The basis of appraisal and valuation. Common diamond settings.

GD14. Diamond Simulants

- Diamond simulants, natural or artificial. Assembled (composite) stones. Identification of diamond; distinction of diamond from its simulants by means of external and internal characteristics, particularly with the use of the 10x lens; by the use of instruments, including the use of diamond testers, specific gravity, fluorescence, X-rays.

Practical syllabus

Part A – Contains thirteen loose polished stones: each diamond will have been pre-graded in London according to GIA and CIBJO grading systems. Answers must be given in either the GIA or the CIBJO systems. One stone will be viewed at a time. Part A requires diamond identification, colour grading, clarity grading, description of symmetry, proportions and girdle details, detection of treatments and detection (but not identification) of simulants.

One or more of the stones in Part A may be a treated diamond, or a diamond simulant, or an assembled stone. Colour and clarity grading of fracture-filled stones is not required. Both colour and clarity grading of laser-drilled stones is required.

If a candidate states that a diamond is a diamond simulant, or that a diamond simulant is a diamond, this is counted as a wrong identification.

Students are required to carry out the following:

- Identification of diamond and distinction of diamond from its simulants. To identify diamond using 10x lens only. Simple tests to distinguish diamond from simulants. Identification of the simulant species is not required.
- Detection of diamond treatments: the detection of laser drill-holes made to improve the appearance of diamond inclusions. The detection of artificially-filled fractures reaching the surface ('fracture-filled' diamonds).
- Cut grading: visual estimation of table symmetry and approximate table diameter percentage using the 10x lens and the 'bowing' method; crown angle by 'third of right angle' method; pavilion depth by 'ratio' method; estimation of 'fish-eye' and 'lumpy' extremes. Girdle width and condition.
- Colour grading: use of a folded white card and grading lamp, with or without colour comparison ('master') stones, to assess colour grade using the CIBJO/GIA system colour grades, down to grade 'Tinted/N'.
- Clarity grading: use of the 10x lens (loupe), diamond tongs and grading lamp to assess the clarity grade, using the CIBJO/GIA system clarity grades.

Part B – Contains five rough diamonds. Grading is not required.

Students are required to carry out the following:

- Observation, using the 10x lens: crystal faces and forms, cleavage faces and incipient cleavage, inclusions, coating, and external and internal evidence of twinning. General description of quality, transparency/opacity and of colour.

Further information

Other related documents available from Gem-A:

- Sample past papers.
- Exam reports.
- Annual prospectus which includes information on fees and examination dates.
- Gem-A's student handbook which includes information on:
Reasonable adjustments and special considerations policy and procedures.
Examination enquires and appeals .
Malpractice procedures.
Equal opportunities policy.

For these documents or further information relating to any of Gem-A's courses and examinations please contact education@gem-a.com or go to www.gem-a.com.