MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATIONS, MUMBAI 51

1	Name of Syllabus	C.C. in Programme on Gemmology and Diamond Grading (**416104**)
2	Max. Nos of Students	25
3	Duration	6 month
4	Type	Part Time
5	Nos. of Days / Week	6 Days
6	Nos of Hours / Days	4 Hrs
7	Space Required	ClassRoom = 200 sq ft WorkShop = 200 sq ft **Total = 400 sq ft**
8	Entry Qualification	SSC pass
9	Objective of Syllabus / Introduction	Impart Education and Build Skills so that a person can join at Entry Level and also can explore starting own setup in Gem & Jewellery industry. Objective of syllabus is to understand gemstone identification process and to Grade the 4 C's of diamonds.
10	Employment Opportunity	Both the Employment / Self Employment in gem and jewellery industry
11	Teacher's Qualification	Diploma/Certificate in concern subject
12	Training System	Training System Per Week

Theory	Practical	Total
6 Hours	18 Hours	24 hours

13 Exam System

Sr No.	Paper Code	Name of Subject	TH/PR	Hours	Max Marks	Min. Marks
1	**41610411**	GEMMOLOGY	TH - 1	3 Hr.	100	35
2	**41610412**	DIAMOND & 4 C's	TH - 2	3 Hr.	100	35
3	**41610421**	GEMMOLOGY	PR - 1	3 Hr.	100	50
4	**41610422**	DIAMOND & 4 C's	PR - 2	3 Hr.	100	50
		Total			**400**	**170**

Theory - 1 Basic of Gemmology and Its Identification	
1	**Introduction of gems :**
	Basic qualities
	Chemical Composition
2	**Crystallography of gemstones**
	Nature of Crystals: Systems of Crystallography,Crystalline and non Crystalline Materials Forms Habit, Twinning.
3	**Physical Properties**
	Hardness
	Cleavage
	SG
4	**Optical properties :**
	Colour
	Transparency
	Visible Spectrum
	Light Reflection
	Total Internal Reflection; Single and Double Refraction
	Dispersion
	Polarization and Pleochroism
	Refractive index and its determination by Refractometer; Reflectivity; Reflectometers.
5	**Causes of colour in gemstones and Phenomena:**
	Interference; Lustre, Sheen, Opalescence, Adularescence, Irridescence, Asterism, Chatoyancy.
6	**Use of instruments such as :**
	Loupe, Microscope, Spectroscope, Dichroscope, Chelsea Colour Filter, Ultraviolet light, Polariscope, Refractometer.
7	**Differentiating Natural Gemstones From Its Synthetics And Simulants**
8	**Different Types of Synthetics & Its Identification**
9	**Description of Gem Stones with Practical Lab session**
	The varieties and colours, species, chemical composition and crystal systems, physical properties etc
	Special characteristics and provenance of the major gemstone used in Gem & Jewellery industry
	Observation of external features (cut, colour, fractures, etc.) of a gemstone using a "10x lens
	Observation of external symmetry, surface marks and cleavage of various crystals and their identification
	Determination of hardness on Moh's Scale using hardness pencils and hardness plates
	Determination of specific gravity by hydrostatic weighing method.
	Measurement of refractive indices and birefringence tests using a gem-testing refractometer
	Detection of double refraction, interference figures and internal strain with the polariscope
	Detection of double refraction, by observing pleochroic colours with the dichroscope and 10x lens.
	Study of the absorption spectra of various gemstones using a direct vision spectroscope
	Identification of gemstones on the basis of pleochroic colours
	Study of the fluorescent colours exhibited by various gemstones under ultraviolet (long wave and short wave) light
	Observation of the internal features of various natural and synthetics gemstones with a microscope
	Detecting Different synthetic gemstones
	Identification of unknown gemstones using the above techniques.
	Visual Identification of various gemstones by its crystal system and other external properties
	Various types of cuts and how to cut gemstones.
10	**Identification of gemstones treatments**

Theory - II Diamond Grading	
1	**Basic of Diamonds & 4 C's**
2	**Chemical Composition**
	Trace Elements
3	**Occurrence and their history**
	Diamond History - India
	Major Source
	Formation
	Source and other Influence
4	**Extraction of Diamonds**
	Different Minning Process
	Pre Minning Process
	Post Minning Process
	Minning Methodology
5	**Physical properties of diamonds**
	Crystallography & its effects on Diamond
	Physical properties like Specifice Gravity, Hardness
6	**Optical porperties of diamonds**
	Light
	Interaction of light with diamond
	Impact on diamond value
7	**history of Cut**
	Different Cutting Style
	Brief process regarding the cutting
	Manufacturing process
	Introduction to 4 C's of Diamonds
8	**Clarity**
	Impact on Inclusion and blemished on clarity grading
	GIA clarity Grade
9	**Colour**
	GIA Colour Grading Scale
10	**Cut**
	GIA cut Grading Scale
11	**Carat Weight**
12	**Diamond Treatements, Synthetic & its Simulants**

Practical - 1 Basic of Gemmology and Its Identification	
1	General Observation
2	**Different Crystal system and its identification**
3	**Physical Properties**
	Hardness
	Cleavage
	SG
4	**Optical properties :**
	Colour
	Transparency
	Visible Spectrum
	Light Reflection
	Total Internal Reflection; Single and Double Refraction
	Dispersion
	Polarization and Pleochroism
	Refractive index and its determination by Refractometer; Reflectivity; Reflectometers.
5	**Different Phenomenal stone**
	Interference; Lustre, Sheen, Opalescence, Adularescence, Irridescence, Asterism, Chatoyancy.
6	**Use of instruments such as :**
	Loupe, Microscope, Spectroscope, Dichroscope, Chelsea Colour Filter, Ultraviolet light, Polariscope, Refractometer.
7	**Differentiating Natural Gemstones From Its Synthetics And Simulants**
8	**Different Types of Synthetics & Its Identification**
9	**Description of Gem Stones with Practical Lab session**
	The varieties and colours, species, chemical composition and crystal systems, physical properties etc
	Special characteristics and provenance of the major gemstone used in Gem & Jewellery industry
	Observation of external features (cut, colour, fractures, etc.) of a gemstone using a "10x lens
	Observation of external symmetry, surface marks and cleavage of various crystals and their identification
	Determination of specific gravity by hydrostatic weighing method
	Measurement of refractive indices and birefringence tests using a gem-testing refractometer
	Detection of double refraction, interference figures and internal strain with the polariscope
	Detection of double refraction, by observing pleochroic colours with the dichroscope and 10x lens.
	Study of the absorption spectra of various gemstones using a direct vision spectroscope
	Identification of gemstones on the basis of pleochroic colours
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	Observation of the internal features of various natural and synthetics gemstones with a microscope
	Detecting Different synthetic gemstones
	Identification of unknown gemstones using the above techniques.
	Visual Identification of various gemstones by its crystal system and other external properties
	Various types of cuts and how to cut gemstones.
10	**Identification of gemstones treatments**

Practical - II Diamond Grading	
1	**Basic of Diamonds & 4 C's**
2	**Clarity**
	Impact on Inclusion and blemished on clarity grading
	GIA clarity Grade
3	**Colour**
	GIA Colour Grading Scale
4	**Cut**
	GIA cut Grading Scale
5	**Carat Weight**
6	**Diamond Treatements, Synthetic & its Simulants**

List of the Instruments required per student

Sr. No.	Items
1	Microscope
2	Refractometer
3	Poloriscope
4	Dicroscope
5	Spectroscope
6	Tweezer
7	Grading Lamps
8	Loupe
9	Gem Cloth

List of the Reference Books

Sr. No.	Items	Publishers
1	Gems by Robert Webster	Robert Webster
2	Diamond and Diamond Grading	Basil Anderson
3	Minerals	Cambridge University
4	ABC of diamond grading	Rubin & Son, 2001
5	Photoatlas (Vol 1 - 2- 3)	Eduard Josef Gübelin, John I. Koivula
6	Gemmology	Robert C. Kammerling