

Semester: VI

**Skill Enhancement Course (SEC):
Gems, Precious Stone and Building Materials**

No. of Teaching Hours (Theory): 75 Hours

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITE OF THE COURSE

Course Title	Credits	Credit Distribution of the Course			Eligibility Criteria	Pre-requisite (if any)
		Lecture	Tutorial	Practical/ Lab		
Gems, Precious Stone and Building Materials (SEC)	04	03	NA	01	Class X+II with Science	Fundamental knowledge of Physics and Chemistry.

Course Title: Gems, Precious Stone and Building Materials (Theory)		
Course Type: SEC	Total Credit: 03	Teaching Hours: 45
Course Outcome: After successful completion of this course the students will be well versed with the properties, grades, and varieties of gems, precious stones and building materials. They will be able to differentiate between original and fake gems and precious stones. They will also learn about the quality of building and decorative stones and their exploration, particularly in the context of Uttarakhand state.		
Units	Course Contents	Teaching Hours
Unit-I	Definition and characteristics of minerals and gems. Characteristics and Identification of Gems. Chemical composition, and diagnostic physical and optical properties of common gems: Diamond (Heera), Corundum (Ruby/Manik, Sapphire/Neelam), Topaz and Yellow Sapphire (Pukhraj), Beryl (Emerald/Panna), Tourmaline, Zircon, Quartz (Amythyst/Jamuniya), Garnet (Gomed), Jadeite (Harit Manik), Nephrite (Jade), Chrysoberyl (cat's eye or Lahsuniya). Grading of gems. Basic ideas of gem cutting.	12

Unit-II	Characteristic properties of common precious stones and organic products: Tiger's eye (Krishna kant Manik), Lapis Lazuli, Obsidian, Pearl (Moti), Coral (Moonga). Common Decorative Stones: Pegmatite, Granite, Serpentinite, Marble, Schist, Coquina limestone, Stromatolitic Limestone, Geode, Agate slices, Cobbles and Pebbles.	11
Unit-III	Building materials, their properties, and types. Common types of building stones: Gneiss, Slate, Quartzite, Limestones/Dolomites, Basalt, Laterite, Sandstones. Cement grade limestone. River-bed materials (RBM) and its exploration; Rock crushing. Basic principles of stone quarrying.	11
Unit-IV	Common building materials in different parts of Uttarakhand: northern (Great and Inner Lesser Himalaya), central (Nappes of Lesser Himalaya and Siwalik) and southern (Piedmont zone) belts. Quarrying and RBM mining policy of Uttarakhand. Environmental issues related to quarrying and riverbed mining activities	11

Course Title: Gems, Precious Stone and Building Materials (Lab)		
Course Type: SEC	Total Credit: 01	Teaching Hours: 30
Sections	Course Contents	Teaching Hours
Section-A	Study of Physical Properties of Gems, Precious Stones and Building Materials in Hand Specimen.	30

Suggested Reading:

- Berry, L.G., Mason, B. and Dietrich, R.V. (1982). Mineralogy. CBS Publication.
- Liddicoat, Richard T. (1989) Handbook of Gem Identification. 12th ed., rev., Gemological Institute of America, Santa Monica, CA.
- Nassau, Kurt (1994). Gemstone Enhancement: History, Science and State of the Art. 2nd ed. Butterworth-Heinemann, London. "Gemstones: A Complete Color Reference" by Antonis Perakis - A comprehensive guide with detailed photos.
- "The Gemstone Book" by Richard W. Wise - Covers gemstone history, properties, and identification.
- "The Handbook of Gemmology" by Richard T. Liddicoat - A detailed guide covering gemstone properties, identification, and market trends.
- "Gemmology" by Peter G. Read - Explores gemstone science, identification, and valuation.
- "Petrology of Sedimentary Rocks: Building Stones" by Richard H. Worden - An advanced text covering the petrology of sedimentary building stones.
- "Geology for Civil Engineers: Building Stones" by Richard E. Jackson - Explores the geology of building stones and their applications.

- "Conservation of Building and Decorative Stone" by Eric Doehne and Clifford A. Price - A comprehensive guide to the conservation of building and decorative stones.

Suggested Online Link:

- Gemological Institute of America (GIA) Online Courses
- International Gemological Institute (IGI) Online Courses
- <https://dgm.uk.gov.in/pages/display/544-mineral-policy>