



# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## Shri Vaishnav Institute of Science

### Department of Chemistry

#### Generic Elective Course

#### Choice Based Credit System (CBCS)

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY			PRACTICAL	
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
GUCH206	UG	Exploring Chemical Concepts in the Digital Realm	3	0	0	3	60	20	20	00	00

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;

\*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

#### Course Objectives:

1. To increase scientific literacy in a general population of students.
2. Students will be introduced to the integration of chemical education in technology.

#### Course Outcomes:

1. Students will be able to understand the characteristics and disadvantages of Fuel and to understand the components, working and applications of batteries.
2. Students will acquire an understanding of the properties and applications of materials used in industries.
3. Students will comprehend the significance of chemistry in computing and engineering.
4. Students will be able to understand the significance of chemistry in recent trends of technologies.
5. Students will gain insight into the adverse effects of e-waste and the needs of e-waste management.

#### Syllabus:

##### Unit I: Energy Systems

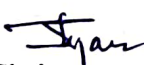
Characteristics of good fuel, Combustion, Calorific value. Natural gas, Biogas and LPG – their composition and uses. Pollution due to burning of fossil fuel.

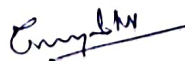
Primary and secondary batteries, Battery components and their role, Characteristics of battery, Fuel cells and Solar cell. Supercapacitors.

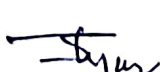
##### Unit II: Materials for Industrial Importance

Metals and alloys: Important metals and alloys, Iron, Copper, Aluminium, Lead, Nickel, Titanium and their alloys – mechanical and chemical properties and their applications.

Polymeric materials: Industrial polymers and composite materials – their constitutions, chemical and physical properties, industrial applications.

  
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#### Unit III: Role of Chemistry in Engineering

Importance of chemistry in computing, Elements and compounds used in transistors, Cathode ray tube, Liquid crystal display (LCD), Properties and materials used in resistors and capacitors, Chemistry in mobiles and laptops: screen, touch screen, Charging-discharging process in batteries.

#### Unit IV: Chemistry for Forefront Concepts

Chemistry in quantum computing, Artificial intelligence (AI), Machine learning, Internet of Things (IoT), Cloud computing, Virtual chemistry: simulation and animation.

#### Unit V: E-Waste

Sources of e-waste, need of e-waste management, Toxic materials used in manufacturing electronic and electrical products, Health hazards due to exposure to e-waste. Recycling and Recovery.

#### References:

1. Engineering Chemistry, P.C. Jain & Monika Jain, Dhanapat Rai Publishing Company, New Delhi.
2. Electrochemical energy: Advanced materials and technologies, J Zhang (CRC press).
3. The handbook of lithium – ion battery pack design: Chemistry, components, types and terminology, John Warner (Elsevier).
4. Engineering Chemistry, Bahl and Tuli.
5. Environmental Chemistry and Pollution Control, S.S Dara.
6. Supercapacitors: Materials, Systems, and Applications, Max Lu, Francois Beguin, Elzbieta Frackowiak, Wile.
7. Environmental Chemistry, De, A. K., 720New Age International.

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