



## National Institute of Technology Meghalaya

An Institute of National Importance

**CURRICULUM**

Programme	Bachelor of Technology (All Branches)	Year of Regulation	2024-25												
Department	Chemical and Biological Sciences	Semester	I/II												
Course Code	Course Name	Pre requisite	Credit Structure				Marks Distribution								
			L	T	P	C	INT	MID	END	Total					
CB 101	Engineering Chemistry	NIL	3	0	0	3	50	50	100	200					
			CO's		Statement			Bloom's Taxonomy							
Course Objectives	To learn about metallurgy, metal extraction process, composition, and properties of alloys	Course Outcomes	CB101.1	Able to <b>explain</b> the process of metal extraction from ores and discuss the properties of alloys and composition				Analyze							
	To introduce students to different types of materials, properties, and their applications.		CB101.2	Able to <b>analyze</b> the properties of different materials and apply the knowledge of nanotechnology for various practical applications.				Analyze							
	To teach electrochemistry and its application for energy storage systems and corrosion prevention.		CB101.3	Able to <b>apply</b> electrochemistry knowledge for different energy storage devices and corrosion prevention				Apply							
	To gain knowledge of different types of fuels and their analysis		CB101.4	Able to <b>describe</b> different types of fuels and their analysis, petroleum technology				Understand							
	To introduce the students to the concept, classifications, and industrial applications of polymers		CB101.5	The students will be able to <b>apply</b> the knowledge about polymers, polymerization processes, and their industrial applications.				Apply							
COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CB101.1	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CB101.2	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CB101.3	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CB101.4	2	2	3	-	-	-	-	-	-	-	-	-	-	-	-
CB101.5	2	2	3												
<b>CB101</b>	2	2	3												

### SYLLABUS

No.	Content	Hours	COs
I	<b>Metallurgy:</b> Minerals, ores, and general methods of extraction and purification of metals (Fe, Al, Cu, Zn). Alloys: Definition of alloy, types of alloys (ferro, non-ferro & amalgam), composition, properties, and uses of brass, bronze, and steel.	<b>08</b>	CB101.1
II	<b>Material Chemistry:</b> Introduction and properties of glass, ceramics and their composites, magnetic materials, and smart materials. Piezoceramic materials, electro-active materials, shape-memory materials, energy harvesting materials, self-healing materials, semiconducting materials, and liquid crystals. <b>Nanomaterials:</b> Introduction, classification, properties of nanomaterials, carbon-based nanomaterials, synthesis of nanomaterials, top-down and bottom-up approaches, characterization of nanomaterials, applications of nanomaterials, nanotechnology for pharmaceutical applications, nanomaterials for tissue engineering, and nanocomposites in textiles.	<b>12</b>	CB101.2
III	<b>Electrochemistry and Corrosion:</b> Introduction to electrochemistry, Nernst's law and its applications, galvanic series. Batteries (Lead-Acid, Ni-Cd, NiMH, Li-ion), fuel cells (PEMFC, MCFC, SOFC, DMFC). Corrosion and its prevention.	<b>06</b>	CB101.3
IV	<b>Petroleum Chemistry:</b> Composition, characteristics of crude oil, cracking. Solid, liquid and gaseous fuels, coal analysis; classification of coal; anti-knocking agents, octane number and cetane number, aviation fuel and biofuels, lubricants.	<b>06</b>	CB101.4
V	<b>Polymer Chemistry:</b> Concepts, classification, structures, and molecular weights of polymers, mechanism and kinetics of various polymerization processes, natural rubber and its properties, vulcanization of rubber, synthesis and applications of various industrial polymers, adhesives, paints, conducting polymers and their applications in electronic devices, biodegradable polymers.	<b>10</b>	CB101.5
<b>Total Hours</b>		<b>42</b>	

#### Essential Readings

- P. C. Jain and M. Jain, "Engineering Chemistry", 17<sup>th</sup> Edition", Dhanpat Rai Publication Co., 2019.
- S. Chawla, "A Text Book of Engineering Chemistry", 1<sup>st</sup> Edition, Dhanpat Rai & Co. (P) Limited, 2017

#### Supplementary Readings

- M. G. Fontana, "Corrosion Engineering", Third Edition, McGraw-Hill Book Company, 2017
- R. Gopalan, D. Venkappayya, S. Nagarajan, "A textbook of Engineering Chemistry" 4th Edition, Vikas Publishing House Pvt. Ltd.
- S. Agarwal, "Engineering Chemistry: Fundamentals and Applications", 2nd edition, Cambridge University Press, 2019