GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3172118
Semester –VII
Subject Name: Introduction to standards and specifications in Metallurgy

Type of course: Engineering

Prerequisite: Basic knowledge of metallurgical processes

Rationale:
Standards are an important part of our society, serving as rules to measure or judge capacity, quantity, content, extent, value and quality. Standards set criteria for use and practice in industry and for products used in everyday life. This introduction, however, deals primarily with standards that set a level of adequacy. It is these standards, above all others, which must be addressed before any engineering activity can be started. This course is offered to fulfill majority requirements of industrial testing and quality standards.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs
1	Define Standard, code and specifications and its need, Different standards like AISI, ASTM, BIS, EN, DIN, JS, SAE for metallic materials, Concept of quality, quality control and inspection, Introduction to ISO 9000 & 14000 standards, Total quality management	**10**
2	Mechanical Testing of Metals as per ASTM and other equivalent standard like Tensile testing (E8 and B557, IS1608), Hardness (IS1586, IS1500,) and Micro hardness testing (E384), Creep, Fatigue, Impact Testing (Izod-ASTM D256, Charpy-ASTM E2248) Wear (G99), Cupping	**10**
3	ASME Section II, Part A- Ferrous base metal, part- B Non Ferrous Base metal, Part-C Welding consumables, Boiler and Pressure Vessel Code: ASME Section IX for Testing and inspection of welds, ASME Section V- Non Destructive Examination	**10**
4	Standard for Metallography like macroscopic examination (E381), optical microscopy (E407), grain size measurement (E112), inclusion rating (E45).	**04**
5	ASTM Standards for corrosion testing: IGC A262 and A763 Practice A, B, C, D, E, Galvanic (G71), Crevice (G78), Pitting (G48), SCC (G36), Salt Spray (B117), Hydrogen Embrittlement (F519)	**08**
	Total	**42**

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Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**30**	**40**	**15**	**05**	**0**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Students are required to use different standards and codes of ASTM, ASM, ASME, IS etc.

1. Testing of Metals Alok Nayar 2005 McGraw Hill Education (India) Private Limited

Course Outcomes:

Sr. No.	CO statement	Marks % weightage
CO-1	Understand various metallurgical processes with standard	30
CO-2	Understand various metallurgical testing with standard	30
CO-3	Apply standard and specification for different engineering quality control	40

List of Open Source Software/learning website:

http://164.100.105.198:8098/php/BIS/PublishStandards/published/subcommtt?depid=NzA%3D
https://www.astm.org/Standards/steel-standards.html