GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code:3172616
Semester – VII
Subject Name: Silicone Rubber Technology

Type of course: Professional Elective Course-VI

Prerequisite:

Rationale:

Teaching and Examination Scheme:

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

Content:

Sr. No.	Content	Total Hrs
1	**Introduction:** Nomenclature of Organo silicone Compounds & Elastomers, Manufacture of Silicone Elastomers, Structure & Properties of Silicone Elastomer Polymers, General Properties, Applications	06
2	**Preparation of Silanes with Nonfunctional Organic Substituents:** Monomers in Silicone Chemistry, Direct Syntheses, Influence of The Type of Silicon, Influence of Catalytically Active Metals, Composition of The Gas Phase, Performance On The Industrial Scale, Advantages And Disadvantages Of The Direct Synthesis	06
3	**Organometallic Synthesis:** Grignard Syntheses, Syntheses With Organic Compounds Of The Alkali Metals, Synthesis With Other Organometallic Compounds, Syntheses By The Reaction Of Hydrocarbons With Silanes, Addition Of The Si—H Bond To Unsaturated Hydrocarbons, Substitution Reactions Of The Si—H Bond	06
4	**Compounding of Heat vulcanizing Silicone Rubbers:** Processing of Silicone rubbers, Compounding Ingredient used in Silicone rubber, Crosslinking System, , Troubleshooting &compounding related problems	07
5	**Molding of Heat vulcanizing silicone Rubbers:** Compression molding, Performer, Transfer molding , Automatic transfer molding, Extrusion, Injection Molding, Cold manifold mold for injection molding, Future for injection molding, Blow **molding, Deflashing of molded parts, oven curing , Trouble shooting problem**	06
6	**Silicone water based Elastomers:** Introduction, Preparation, Crosslinking, Fillers, Particle Coalescence and film formation, Properties of Silicone water based Elastomers, Application	06

7	**Room Temperature Vulcanizing Silicone Rubbers:** Introduction, Properties, Materials, Manufacturing method of RTV silicone, Method of Constructing RTV mold, Types of RTV, Application , Future development	**08**

Suggested Specification table with Marks (Theory): (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**10**	**15**	**15**	**10**	**10**

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:-

- Handbook of SILICONE RUBBER Fabrication by Wilfred Lynch
- Chemistry and Technology of Silicones by WALTER NOLL
- SILICONE DISPERSIONS by Yihan Liu
- Liquid Silicone Rubber Chemistry, Materials and Processing by Johannes Karl Fink

Course Outcome:

After learning this course students will be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Identify the different types of Silicone Compound	10
CO-2	Analyze the effects of different types of silicone& Hydrocarbons on end product properties	15
CO-3	Solve the problems related to compounding, mixing and environment	15
CO-4	Study, understand and generate the sequence of molding operation to produce the end product.	15
CO-5	Analyze the effects of different compounding ingredients on different types of silicone rubber	15

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List of Open Source Software/learning website:

- https://www.sciencedirect.com/topics/engineering/silicone-rubber/
- https://www.sae.org/learn/content/c1804/
- https://www.dowcorning.com.cn
- https://rubbertechnology.info/en/-rubber-compounds/silicone-rubber--vmq/