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# ENGINEERING PHYSICS

8<sup>TH</sup> EDITION



**G VIJAYAKUMARI**

# Engineering Physics



# Engineering Physics

(FOR GUJARAT TECHNOLOGICAL UNIVERSITY)

**Eighth Edition**

*(With Practicals)*

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**My Beloved Parents**  
**&**  
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# Preface

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This textbook is written and designed with utmost care bearing the needs of the first year BE/BTech students in mind. Giving greatest attention to the prescribed syllabies the book has a comprehensive coverage.

All efforts have been made to make the concepts clear to the students. In each unit, the topics and their sub topics are carefully arranged and elaborately discussed from the elementary level. Illustrative examples have been given wherever necessary. Continuity in the development of subject matter and uniformity in the style of presentation has been specifically taken care of for the convenience of the students.

At the end of each chapter, a number of assignment problems, all the possible short questions with answers and some descriptive answer questions have been provided.

Although proper care has been taken during the preparation and proof reading of the manuscript, some errors may still have crept in. Any omissions, errors and suggestion brought to the knowledge of the author will be gratefully acknowledged and would be rectified in the subsequent edition.

**G Vijayakumari**

# Acknowledgement

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First of all I wish to thank the authorities of **Directorate of Collegiate Education**, Tamilnadu, for granting permission in bringing out this edition.

With a great sense of respect, I thank **Dr K Kumaraswamy** for his long and refreshing encouragement. I am very grateful to him for the clarification and suggestions given to me at various instances during the preparation of this book and also in my career.

It is my privilege and pleasure to express my genuine appreciation to **Dr UDAY N TRIVEDI** Assistant Professor of Physics, Instrumentation & Control Engineering Department, Vishwakarma Government Engineering College, Chandkheda, Gandhinagar and **Dr Vani K Chhaniwal**, Assistant Professor of Physics, PIET for their valuable suggestion and constructive criticism.

I appreciate the cooperation and support extended by **Mr N Mahesh** and his family members. I am grateful to them for their constant encouragement and keen interest in my writing and publishing this book.

I pay regards to my ever-loving colleagues and well-wishers for their immense help at each and every step in completing this textbook.

I am indebted to the many students I have had over the years for their enthusiasm and constructive criticism.

I also acknowledge all those who have, in one way or the other, contributed to this work. I am indeed grateful to all the authors and publishers of books, which have been referred to, during the preparation of this text.

I express my sincere thanks to **Vikas Publishing House Pvt Ltd** and **its editorial team** for their kind support and refreshing encouragement in bringing out this edition in its excellent form in record time.

**G Vijayakumari**

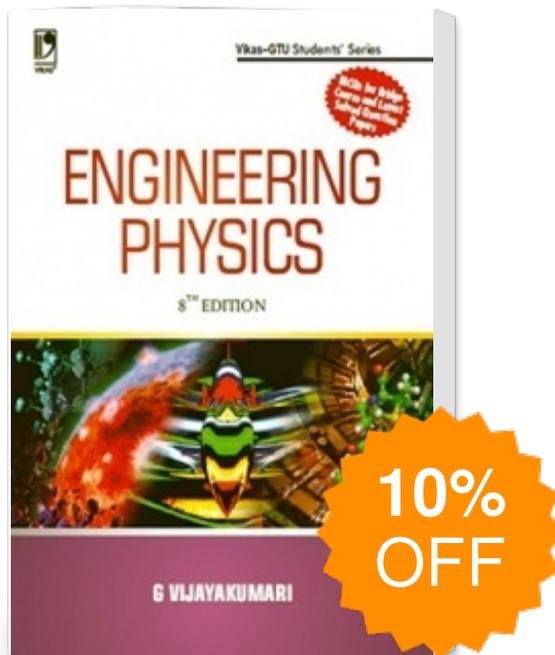
# Syllabus

## GUJARAT TECHNOLOGICAL UNIVERSITY

### ENGINEERING PHYSICS

<i>Sr No.</i>	<i>Topics</i>	<i>Teaching Hrs.</i>	<i>Module Weightage</i>
1	<b>DIELECTRICS:</b>		
	<ul style="list-style-type: none"> <li>Definitions : Electric field intensity, Electric flux, Dielectric parameters</li> <li>Types of dielectric materials : Solid, Liquid and Gaseous</li> <li>Classification of electrical insulating materials</li> <li>Claussius-Mosotti equation</li> <li>Uses of dielectric materials; <b>Capacitors: Single and multilayer, Polymeric Film, Electrolytic; Power and Distribution transformers, other applications</b></li> </ul>	5	15%
2	<b>MAGNETIC MATERIALS:</b>		
	<ul style="list-style-type: none"> <li>Definitions : <b>Magnetic moment, Magnetic dipole, Magnetic Field strength, Magnetic flux density, Intensity of magnetization, Magnetic dipole moment, Magnetic field intensity, Magnetic permeability, Magnetic susceptibility, Bohr magnetron</b></li> <li>Classification of magnetic materials on the basis of magnetic moment</li> <li>Soft and hard magnetic materials</li> <li>Anti-ferromagnetic materials</li> <li>Ferrites</li> <li>Magnetic recording and readout storage of magnetic data</li> </ul>	5	15%
3	<b>ACOUSTICS AND ULTRASONICS:</b>		
	<ul style="list-style-type: none"> <li>Introduction, Classification and Characteristics of sound</li> <li>Sabine's formula for reverberation (without derivations)</li> <li>Introduction of absorption co-efficient</li> <li>Sound absorbing materials</li> <li>Factors affecting the acoustics of buildings and their remedies</li> <li>Sound insulation</li> <li>Noise pollutions</li> <li>Noise control in machines</li> <li>Properties of ultrasound</li> <li>Generation of ultrasound by (1) piezoelectric method and (2) magnetostriction method</li> <li>Methods for ultrasound velocity measurement</li> <li>Applications of ultrasound: <b>Industry, Medicine</b></li> <li>NDT through Ultrasonics</li> </ul>	5	15%
4	<b>SUPERCONDUCTIVITY:</b>		
	<ul style="list-style-type: none"> <li>Superconductivity</li> <li>General properties of superconductors</li> <li>Types of superconductors</li> </ul>	4	10%
<i>Sr No.</i>	<i>Topics</i>	<i>Teaching Hrs.</i>	<i>Module Weightage</i>

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