

Preface

Electrical distribution is one of the most important wings in Electrical Power Industry but is given less importance. For most efficient, reliable and uninterrupted, electrical power supply, proper planning and protection in distribution of power is important. Conventionally, this topic is treated as one or two chapters in Electrical Power System courses and only few universities offer it as a separate course.

About twenty years back, when it was introduced as an elective course for PG courses and later for undergraduate courses, there was no proper book that could be referred by either the students or the teachers. Reference was mainly made to the IEEE Std.. 141 of 1976 (Electrical Power Distribution for Industrial Practices) and also to Electrical Power Distribution Engineering by Turan Gonen which mainly dealt with the practices and systems adopted in US and the American continent. These procedures adopted and other technical aspects were quite different and are neither seen or practiced in India.

Electrical distribution mainly deals with transportation of electrical energy from main transmission stations to the customer premises and deals with both low voltages (less than 1000 V) and medium voltage (1000 V to less 33,000 V) of three-phase dc and other special systems like 1500 V or 3000 V dc and 25 kV ac traction systems.

The topics dealt with in this book are

- (a) Distribution system : voltages for primary and secondary distribution
- (b) Nature of loads and load modelling
- (c) Overhead lines and cables
- (d) Voltage drop and power loss in lines and feeders
- (e) Reactive power compensation and capacitor applications
- (f) Substation equipment, grounding and substation automation
- (g) System faults and protection,
- (h) Metering and tariffs
- (i) Voltage control, system planning and automation

All the topics included in Electrical Power Distribution courses are dealt with and a few additional topics added to have a comprehensive idea over Electrical Power Distribution. This book will also help the electrical engineers working in power distribution as well as industrial distribution to improve the quality of power supply. A few worked examples, review questions, multiple choice and short questions are added at the end of each chapter to help the student have better understanding of the topics.

The book is divided into 12 chapters. **Chapter 1** briefly introduces supply systems and distribution practices. **Chapter 2** discusses load characteristics and load modeling. **Chapters 3 and 4** explain overhead lines and cables, and distribution feeders respectively. **Chapter 5** deals with primary and secondary distribution networks. Voltage drop and power loss calculations are explained in **Chapter 6**.

Chapter 7 discusses reactive power compensation and applications of capacitors, while equipment, loading and grounding of substations is dealt with in **Chapter 8**. **Chapter 9** is on faults and over-voltages in distribution systems. **Chapter 10** explains the various types of protection used in devices. **Chapter 11** discusses metering, instrumentation and tariffs. Finally, **Chapter 12** deals with system planning and automation in voltage control.

The Web supplements can be accessed at

<http://www.mhhe.com/kamaraju/epds> and contains

Instructor Resources: Answers of selected problems, Model syllabus

Student Resources: Interactive quiz, Web links for further reading

Sincere thanks are also due to the reviewers who took out time to review the book. Their names are given below.

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