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for Semesters III and IV

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Published by McGraw Hill Education (India) Private Limited
P-24, Green Park Extension, New Delhi 110 016

Engineering Mathematics for Semesters III and IV

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This edition can be exported from India only by the publishers,
McGraw Hill Education (India) Private Limited.

Print Edition
ISBN 13: 978-93-858-8050-6
ISBN 10: 93-858-8050-0

EBook Edition
ISBN 13: 978-93-858-8051-3
ISBN 10: 93-858-8051-9

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Typeset at Text-o-Graphics, B-1/56, Aravali Apartment, Sector-34, Noida 201 301, and printed at

Cover Printer:

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Preface

Engineering Mathematics for Semesters III and IV deals with the applications of applied Mathematics in the field of Engineering. This subject is generally taught in the III and IV semester of engineering. In the first edition of book "Engineering mathematics for Semester I and II" we learnt about the basics of engineering mathematics as a branch of applied mathematics concerning mathematical models (mathematical methods and techniques) that are typically used in engineering and industry. This book on semesters III and IV will prepare students for their domain specific study and applications in their respective branches.

This book will also introduce the students to the concepts of Fourier transform, z-transform, complex variable, probability and numerical techniques.

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  - Drill and Practice Problem: **1100**

Chapter Organization

The book is divided in fifteen chapters. In **Chapter 1**, we have discussed Fourier transform which includes Fourier transform of some basic functions and the properties of the Fourier Transform. **Chapter 2** deals with Z-Transform, inverse Z-transform, Cauchy's residue theorem, convolution theorem and properties of Z-transform. In **Chapter 3**, basic concepts of complex theory including basic concepts of complex numbers, Cauchy–Riemann equations, conjugate and conjugate harmonic equations, complex integrals, expansion of analytic functions as power series, zeros of analytic functions, calculus of residues, singularities, complex integrals, Cauchy's residue theorem, etc., are discussed. **Chapter 4** covers empirical laws and curve fitting along with scatter diagram and various methods of curve fitting. In **Chapter 5,** we present various statistical methods while in **Chapter 6** basic concepts of probability such as additive law, multiplicative and conditional probability, Baye's theorem,

probability distribution (discrete and continuous in general and some specific distributions such as binomial, Poisson, uniform, exponential and normal are discussed. **Chapter 7** deals with sampling, inference and testing of hypotheses which includes parameters and statistics, type I and II errors, confidence intervals and F, chi-square and Z statistic. In **Chapter 8,** various formulas for numerical differentiation and integrations are discussed while **Chapters 9** and **10** deal with numerical solution of differential equations and finite differences and interpolation, respectively. **Chapters 11 and 12** talk about numerical solutions of ordinary differential equations and partial differential equations, respectively. In **Chapter 13,** linear programming and various methods to solve linear programming including transportation and assignment problems, duality and dual simplex method, etc., have been discussed. **Chapters 14 and 15** cover the method of variational with fixed boundaries while **Chapter 15** deals with integral equations.

Online Learning Center

The Online Learning Center can be accessed at *http://www.mhhe.com/gupta/em3/4* and contains the *Instructor Elements*: Solutions Manual.

Acknowledgements

The authors are thankful to all who have directly or indirectly helped them during the preparation of this book. We are also thankful to all our family members for their encouragement, patience, and all possible help provided by them while we were engaged in writing the manuscript. We would also like to thank the following reviewers for their feedback and comments:

Rama Bhargava	*Indian Institute of Technology (IIT) Roorkee, Roorkee, Uttarakhand*
Rajesh Kumar Gupta	*Lovely Professional University , Phagwara, Punjab*
Uma Arora	*JRE Group of Institutions, Greater Noida, Uttar Pradesh*
Rashmi Mishra	*G. L. Bajaj Institute of Technology and Management, Greater Noida, Uttar Pradesh*
Paras Ram	*National Institute of Technology (NIT), Kurukshetra, Haryana*
Guruprasad Samanta	*Indian Institute of Engineering Science and Technology, Shibpur, West Bengal*
Debdas Mishra	*C. V. Raman College of Engineering, Bhubaneswar, Odisha*
Apu Saha	*National Institute of Technology (NIT) Agartala, Tripura*
Bikash Bhattacharjya	*Indian Instititute of Technology (IIT) Guwahati, Assam*
Som Sahani	*ITM Universe, Vadodra, Gujarat*
Pragnesh Laxmiram Thakkar	*Lalbhai Dalpatbhai College of Engineering, Ahmedabad, Gujarat*
Meena Sankaranarayanan	*Anand Institute of Higher Technology, Chennai, Tamil Nadu*
Prasanna BMR	*Siddaganga Institute of Technology, Tumkuru, Karnataka*

We wish to express our appreciation for the support provided by the staff at McGraw Hill Education (India) during the publication of this book.

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