

Guide to Computing Fundamentals in Cyber-Physical Systems: Concepts, Design Methods, and Applications (Computer Communications and Networks)

By Dietmar P.F. Möller

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This book presents an in-depth review of the state of the art of cyber-physical systems (CPS) and their applications. Relevant case studies are also provided, to help the reader to master the interdisciplinary material. Features: includes self-test exercises in each chapter, together with a glossary; offers a variety of teaching support materials at an associated website, including a comprehensive set of slides and lecture videos; presents a brief overview of the study of systems, and embedded computing systems, before defining CPS; introduces the concepts of the Internet of Things, and ubiquitous (or pervasive) computing; reviews the design challenges of CPS, and their impact on systems and software engineering; describes the ideas behind Industry 4.0 and the revolutions in digital manufacturing, including smart and agile manufacturing, as well as cybersecurity in manufacturing; considers the social impact of the changes in skills required by the globalized, digital work environment of the future.

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Editorial Review

From the Back Cover

This comprehensive guide/reference presents an in-depth review of the state of the art of cyber-physical systems (CPS) and their applications. The text describes the CPS approach in detail, highlighting where the multitude of CPS activities fit within the overall effort, and proposes an ideal framework for understanding the complexity of cyber-physical systems. Relevant case studies are also provided, to help the reader to master the interdisciplinary material. No prior background knowledge is required, other than some familiarity with basic calculus-based probability and statistics, and some experience with systems and software engineering.

Topics and features:

- Includes self-test exercises in each chapter, together with an extensive glossary at the end of the book
- Offers a variety of teaching support materials at an associated website, including a comprehensive set of slides and lecture videos
- Presents a brief overview of the study of systems, and embedded computing systems, before defining CPS
- Introduces the concepts of the Internet of Things, and ubiquitous (or pervasive) computing
- Reviews the design challenges of CPS, and their impact on systems and software engineering
- Describes the ideas behind Industry 4.0 and the revolutions in digital manufacturing, including smart and agile manufacturing, as well as cybersecurity in manufacturing
- Considers the social impact of the changes in skills required by the globalized, digital work environment of the future
- With a foreword by Prof. Dr. K. B. Akhilesh of the Indian Institute of Science, Bangalore, India

Ideally suitable as a textbook for college courses on CPS, this *Guide to Computing Fundamentals in Cyber-Physical Systems* may also be used as a self-study aid, or as a reference for practitioners and researchers involved in CPS and digital manufacturing/Industry 4.0.

Prof. Dr.-Ing. Dietmar P.F. Möller is a Professor in the Institute of Applied Stochastics and Operations Research at Clausthal University of Technology (TUC), Germany, a Member of the Simulation Science Center Clausthal-Göttingen, Germany, and an Adjunct Professor in the Department of Electrical and Computer Engineering at the University of Nebraska-Lincoln (UNL), USA. His other publications include the Springer title *Introduction to Transportation Analysis, Modeling and Simulation*.

About the Author

Prof. Dr.-Ing. Dietmar P.F. Möller is a Full Professor in the Institute of Applied Stochastics and Operations Research at Clausthal University of Technology, Germany, a Member of the Simulation Science Center Clausthal-Göttingen, Germany, and an Adjunct Professor in the Department of Electrical Engineering at the University of Nebraska-Lincoln, USA. His other publications include the Springer title *Introduction to Transportation Analysis, Modeling and Simulation*.

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Gabriel Badger:

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