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Titolo	Mechanics of Composite Structures // by Christian Mittelstedt
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ISBN	3-662-70788-8
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Descrizione fisica	1 online resource (1301 pages)
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Soggetti	Mechanics, Applied Engineering design Machinery Engineering Mechanics Engineering Design Machinery and Machine Elements
Lingua di pubblicazione	Inglese
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Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Some basic concepts of the theory of elasticity -- Plane problems and surface structures -- Variational principles and approximation methods in structural mechanics -- Strength hypotheses for isotropic materials -- Mechanics of a laminate layer -- Classical Laminated Plate Theory -- Static and dynamic laminate problems -- Strength hypotheses for unidirectionally fiber-reinforced laminate layers -- Hygrothermal problems -- Higher-order laminate theories -- Navier-type solutions for laminate buckling problems -- Lévy-type solutions for laminate buckling problems -- Energy methods for laminate buckling problems -- The Ritz method for buckling analysis of shear-deformable laminates -- Buckling of unsymmetric laminates -- Buckling of stiffened laminates -- Postbuckling of laminates -- Sandwich structures -- The free-edge effect -- Laminated shells -- Interlaminar stresses in curved laminates -- Laminate and sandwich beams -- Thin-walled laminated beams -- Buckling of laminated beams -- Generalized Beam Theory.
Sommario/riassunto	This book includes a detailed introduction to the mechanics of composite structures, i.e. thin-walled laminated structures as they are

frequently used in lightweight construction and design. The book is subdivided into five parts. Starting from the basics of linear elasticity in part I, part II is devoted to the mechanics of composite laminates as relevant for the further course of this book and as employed in industrial practice. Part III deals with the buckling and postbuckling behaviour of unstiffened and stiffened thin-walled laminated structures and presents closed-form analytical and semi-analytical approaches for the stability analysis of such structures. Part IV includes some advanced topics such as free-edge effects and laminated shells before part V concludes with the analysis of laminated beam structures. This book is intended for students at universities, but also for engineers in practice and researchers in engineering science. About the author: Univ.-Prof. Dr.-Ing. habil. Christian Mittelstedt studied civil engineering at the University of Wuppertal, where he graduated as Dipl.-Ing. in 1999. He received his doctoral degree from the University of Siegen in 2005 with a dissertation on stress concentration problems in composite laminates. From 2006 he worked in the German aerospace industry as a research engineer and from 2011 as a technical leader and expert in the field of structural analysis. He habilitated in 2012 with a thesis on the stability of thin-walled fibre composite components in lightweight construction and is the author and co-author of more than 200 scientific papers published in international journals, conference proceedings, but also officially recognised calculation manuals. Since August 2016, he has been head of the institute of Lightweight Engineering and Structural Mechanics at the Department of Mechanical Engineering at Darmstadt University of Technology.
