

## Civil Engineering Lecture Notes

This book gathers the latest advances, innovations, and applications in the field of effective methods of calculation, resource-saving technologies and advanced materials in civil and environmental engineering, as presented by leading international researchers and engineers at the XVII International Scientific Conference Current Issues of Civil and Environmental Engineering “Lviv- Košice – Rzeszów”, held in Lviv, Ukraine on September 11-13, 2019. It covers highly diverse topics, including structural shaping and optimization; aspects of structural behavior and modeling; advanced analysis methods; experimental tests and numerical simulations; design codes, in particular Eurocodes and other national and regional limit state codes; and highway and bridges engineering. It also discusses modern architectural and structural solutions; innovative materials and products; durability and maintenance; fabrication and erection; sustainability in construction; renewable energy sources; heat, gas and water supply; ventilation and air-conditioning; ecological and energy-saving technologies; modern water-purification and treatment technologies; and the protection of water ecosystems. The contributions, which were selected by means of a rigorous international peer-review process, highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaborations.

This book comprises selected proceedings of the 2nd International Conference of Construction, Infrastructure, and Materials (ICCIM 2021) focusing on topics such as structural engineering, construction materials, geotechnical engineering, transportation system and engineering, construction management, water resources engineering, and infrastructure development. Its content will be useful to researchers, educators, practitioners, and policymakers alike.

This book gathers peer-reviewed contributions presented at the 3rd National Conference on Structural Engineering and Construction Management (SECON’19), held in Angamaly, Kerala, India, on 15-16 May 2019. The meeting served as a fertile platform for discussion, sharing sound knowledge and introducing novel ideas on issues related to sustainable construction and design for the future. The respective contributions address various aspects of numerical modeling and simulation in structural engineering, structural dynamics and earthquake engineering, advanced analysis and design of foundations, BIM, building energy management, and technical project management. Accordingly, the book offers a valuable, up-to-date tool and essential overview of the subject for scientists and practitioners alike, and will inspire further investigations and research.

This book gathers the latest research, innovations, and applications in the field of civil engineering, as presented by leading national and international academics, researchers, engineers, and postgraduate students at the AWAM International Conference on Civil Engineering 2019 (AICCE’19), held in Penang, Malaysia on August 21-22, 2019. The book covers highly diverse topics in the main fields of civil engineering, including structural and earthquake engineering, environmental engineering, geotechnical engineering, highway and transportation engineering, water resources engineering, and geomatic and construction management. In line with the conference theme, “Transforming the Nation for a Sustainable Tomorrow”, which relates to the United Nations’ 17 Global Goals for Sustainable Development, it highlights important elements in the planning and development stages to establish design standards beneficial to the environment and its surroundings. The contributions introduce numerous exciting ideas that spur novel research directions and foster multidisciplinary collaborations between various specialists in the field of civil engineering.

New Technologies in Building and Construction

Proceedings of the 5th International Conference on Sustainable Civil Engineering Structures and Construction Materials

Geotechnical Engineering and Construction

Select Proceedings of ICSBMC 2021

Select Proceedings of FACE 2019

Civil Engineering Drawing

Select Proceedings of ICRACE 2020

Proceedings of the 1st Vietnam Symposium on Advances in Offshore Engineering

This book gathers selected contributions in the field of civil and construction engineering, as presented by international researchers and engineers at the 2nd International Scientific Conference on Socio-Technical Construction and Civil Engineering (STCCE), held in Kazan, Russia on April 21-28 2021. The book covers a wide range of topics including building constructions and structures, bridges, roads and tunnels, building materials and products, construction management, energy efficiency and thermal protection of buildings, ventilation, air conditioning, gas supply and lighting in buildings, innovative and smart technologies in construction, sustainable development, transport system development. The contributions, which were selected by means of a rigorous

international peer-review process, highlight numerous exciting ideas that will spur novel research directions and foster multidisciplinary collaborations.

This book presents select proceedings of the International Conference on Sustainable Construction and Building Materials (ICSCBM 2018), and examines a range of durable, energy-efficient, and next-generation construction and building materials produced from industrial wastes and byproducts. The topics covered include alternative, eco-friendly construction and building materials, next-generation concretes, energy efficiency in construction, and sustainability in construction project management. The book also discusses various properties and performance attributes of modern-age concretes including their durability, workability, and carbon footprint. As such, it offers a valuable reference for beginners, researchers, and professionals interested in sustainable construction and allied fields.

This book comprises the select proceedings from the 2nd International Conference on Structural Damage Modelling and Assessment (SDMA 2021) held in the city of Ghent, Belgium, on 4–5 August 2021. It discusses the recent advances in fields related to damage modelling, damage detection and assessment, non-destructive testing and evaluation, structure integrity and structural health monitoring. The conference covers all research topics and applications relevant to structural damage modelling and assessment using theoretical, numerical and experimental techniques. This book is useful to scientists and engineers in academia and industry who are interested in the field of structural damage and integrity for disaster risk reduction.

This book introduces purely mechanistic models that are of particular relevance to the pavement engineering profession. It commences with a short recap of basic mechanics concepts, and then delves into topics such as viscoelasticity, elastic half-space solutions, and mechanics of supported plates. Given that all pavement design and analysis approaches are founded on some mechanistic logic, the text essentially offers a universal and long-lasting reference to practitioners and engineering students.

Proceedings of the 4th International Conference on Transportation Geotechnics Volume 2

Proceedings of SECON’19

Seismic Design and Performance

ICACE 2019

Proceedings of FORM 2021

Proceedings of CEE 2019

Lecture Notes CIE4130

Proceedings of SECON’21

***This book presents select papers from the International Conference on Smart Materials and Techniques for Sustainable Development (SMTS) 2019. The contents focus on a wide range of methods and techniques related to sustainable development fields like smart structures and materials, innovation in water resource development, optical fiber communication, green construction materials, optimization and innovation in structural design, structural dynamics and earthquake engineering, structural health monitoring, nanomaterials, nanotechnology and sensors, smart biomaterials and medical devices, smart materials for energy conversion and storage devices, and IoT in sustainable development. This book aims to provide up-to-date and authoritative knowledge from both industrial and academic worlds, sharing best practice in the field of smart materials analysis. The contents of this book will be beneficial to students, researchers, and professionals working in the field of smart materials and sustainable development.***

***This book presents selected articles from the 3rd International Conference on Architecture and Civil Engineering 2019, held in Kuala Lumpur, Malaysia. Written by leading researchers and industry professionals, the papers highlight recent advances and addresses current issues in the fields of civil engineering and architecture.***

***This book presents the select proceedings of the International Conference on Sustainable Building Materials and Construction (ICSBMC 2021), and examines a range of durable, energy-efficient, advance construction and building materials produced from industrial wastes and byproducts. The topics covered include advanced construction materials, durability of concrete structures, waste utilization, repair & rehabilitation of concrete structures, structural analysis & design, composites, nanomaterials and smart materials in seismic engineering. The book also discusses various properties and performance attributes of modern-age concretes including their strength, durability, workability, and carbon footprint. This book will be a precious reference for beginners, researchers, and professionals interested in sustainable construction and allied fields.***

***This book gathers the latest innovations and applications in the field of resource-saving technologies and advanced materials in civil and environmental engineering, as presented by leading international researchers and engineers at the 2nd International Scientific Conference EcoComfort and Current Issues of Civil Engineering, held in Lviv, Ukraine on September 16-18, 2020. It covers a diverse range of topics, including ecological and energy-saving technologies; renewable energy sources; heat and water supply; microclimate provision systems; innovative building materials and products; smart technologies in water purification and treatment; protection of water ecosystems; and architectural shaping and structural solutions. The contributions, which were selected using a rigorous international peer-review process, highlight exciting ideas that will spur novel research directions and foster multidisciplinary collaborations.***

**Sustainable Construction and Building Materials**

**Proceedings of the 1st Global Civil Engineering Conference**

**Select Proceedings of ASCM 2020**

**Producing Drawings, Specifications, and Cost Estimates for Heavy Civil Projects**

**SCESCM 2020**

**Structural Engineering and Construction Management**

**Towards Sustainable Development**

**Current Trends in Civil Engineering**

*This volume presents selected papers presented during the 4th International Conference on Transportation Geotechnics. The papers address the geotechnical challenges in design, construction, maintenance, monitoring, and upgrading of roads, railways, airfields, and harbor facilities and other ground transportation infrastructure with the goal of providing safe, economic, environmental, reliable and sustainable infrastructures. This volume will be of interest to postgraduate students, academics, researchers, and consultants working in the field of civil and transport infrastructure.*

*This book contains selected papers in the area of structural engineering from the proceedings of the conference, Futuristic Approaches in Civil Engineering (FACE) 2019. In the area of construction materials, the book covers high quality research papers on raw materials and manufacture of cement, mixing, rheology and hydration, admixtures, characterization techniques and modeling, fiber-reinforced concrete, repair and retrofitting of concrete structures, novel testing techniques such as digital image correlation (DIC). Research on sustainable building materials like Geopolymer concrete and recycled aggregates are covered. In the area of earthquake engineering, papers related to the seismic response of load-bearing unreinforced masonry walls, reinforced concrete frame and buildings with dampers are covered. Additionally, there are chapters on structures subjected to vehicular impact and fire. The contents of this book will be useful for graduate students, researchers and practitioners working in the areas of concrete, earthquake and structural engineering.*

*This volume presents select papers presented at the 7th International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics. The papers discuss advances in the fields of soil dynamics and geotechnical earthquake engineering. Some of the themes include seismic design of deep & shallow foundations, soil structure interaction under dynamic loading, marine structures, etc. A strong emphasis is placed on connecting academic research and field practice, with many examples, case studies, best practices, and discussions on performance based design. This volume will be of interest to researchers and practicing engineers alike.*

*This volume comprises select peer reviewed papers presented at the international conference - Advanced Research and Innovations in Civil Engineering (ARICE 2019). It brings together a wide variety of innovative topics and current developments in various branches of civil engineering. Some of the major topics covered include structural engineering, water resources engineering, transportation engineering, geotechnical engineering, environmental engineering, and remote sensing. The book also looks at emerging topics such as green building technologies, zero-energy buildings, smart materials, and intelligent transportation systems. Given its contents, the book will prove useful to students, researchers, and professionals working in the field of civil engineering.*

*Proceedings of STCCE 2021*

*The Advances in Civil Engineering Materials*

*Transforming the Nation for a Sustainable Tomorrow*

*Advances in Structural Engineering*

*IPW 2020*

*Select Proceedings of ARICE 2019*

*Pavement Mechanics*

*Select Proceedings of ICSCBM 2018*

*Sing-Kit Choi walks engineers through standard practices, basic principles, and design philosophy needed to prepare quality design and construction documents for a successful infrastructure project.*

*This volume gathers the latest advances, innovations, and applications in the field of pavement technology, presented at the 12th International Conference in Road and Airfield Pavement Technology (ICPT), hosted by the University of Moratuwa, Sri Lanka, and held on July 14-16, 2021. It covers topics such as pavement design, evaluation and construction, pavement materials characterization, sustainability in pavement engineering, pavement maintenance and rehabilitation techniques, pavement management systems and financing, transportation safety, law and enforcement related to pavement engineering, pavement drainage and erosion control, GIS applications, quarry material assessment, pavement instrumentation, IT and AI applications in pavement. Featuring peer-reviewed contributions by leading international researchers and engineers, the book is a timely and highly relevant resource for materials scientists and engineers interested in pavement engineering.*

***This book presents select proceedings of National Conference on Advances in Sustainable Construction Materials (ASCM 2020) and examines a range of durable, energy-efficient, and next-generation construction materials produced from industrial wastes and by-products. The topics covered include sustainable materials and construction, innovations in recycling concrete, green buildings and innovative structures, utilization of waste materials in construction, geopolymer concrete, self-compacting concrete by using industrial waste materials, nanotechnology and sustainability of concrete, environmental sustainability and development, recycling solid wastes as road construction materials, emerging sustainable practices in highway pavements construction, plastic roads, pavement analysis and design, application of geosynthetics for ground improvement, sustainability in offshore geotechnics, green tunnel construction technology and application, ground improvement techniques and municipal solid waste landfill. Given the scope of contents, the book will be useful for researchers and professionals working in the field of civil engineering and especially sustainable structures and green buildings.***

*This volume presents the proceedings of the 18th International Probabilistic Workshop (IPW), which was held in Guimarães, Portugal in May 2021. Probabilistic methods are currently of crucial importance for research and developments in the field of engineering, which face challenges presented by new materials and technologies and rapidly changing societal needs and values. Contemporary needs related to, for example, performance-based design, service-life design, life-cycle analysis, product optimization, assessment of existing structures and structural robustness give rise to new developments as well as accurate and practically applicable probabilistic and statistical engineering methods to support these developments. These proceedings are a valuable resource for anyone interested in contemporary developments in the field of probabilistic engineering applications.*

**Select Articles from the International Conference on Architecture and Civil Engineering (ICACE2020)**

**Lecture notes**

**Selected Articles from the International Conference on Architecture and Civil Engineering**

**Sustainable Building Materials and Construction**

**Proceedings of EcoComfort 2020**

**Construction The Formation of Living Environment**

**Proceedings of the 3rd International Conference on Sustainability in Civil Engineering**

**Advances in Transportation Geotechnics IV**

*This book highlights the latest technologies and applications of Artificial Intelligence (AI) in the domain of construction engineering and management. The construction industry worldwide has been a late bloomer to adopting digital technology, where construction projects are predominantly managed with a heavy reliance on the knowledge and experience of construction professionals. AI works by combining large amounts of data with fast, iterative processing, and intelligent algorithms (e.g., neural networks, process mining, and deep learning), allowing the computer to learn automatically from patterns or features in the data. It provides a wide range of solutions to address many challenging construction problems, such as knowledge discovery, risk estimates, root cause analysis, damage assessment and prediction, and defect detection. A tremendous transformation has taken place in the past years with the emerging applications of AI. This enables industrial practitioners to operate projects more efficiently and safely, not only increasing the automation and productivity in construction but also enhancing the competitiveness globally.*

*The volume presents research works in civil engineering. All manuscripts in this volume were presented during the 2nd International Conference on Architecture and Civil Engineering (ICACE 2018) which was held at Parkroyal Hotel, Penang, Malaysia on 09-10 May 2018. The editor(s) of the proceeding would like to express the utmost gratitude and thanks to all reviewers in the technical team for making this volume a success.*

*These proceedings gather a selection of refereed papers presented at the 1st Vietnam Symposium on Advances in Offshore Engineering (VSOE 2018), held on 1–3 November 2018 in Hanoi, Vietnam. The contributions from researchers, practitioners, policymakers, and entrepreneurs address technological and policy changes intended to promote renewables energy, and to generate business opportunities in oil and gas and offshore renewable energy. With a special focus on energy and geotechnics, the book brings together the latest lessons learned in offshore engineering, technological innovations, cost-effective and safer foundations and structural solutions, environmental protection, hazards, vulnerability, and risk management. The book offers a valuable resource for all graduate students, researchers and industrial practitioners working in the fields of offshore engineering and renewable energies.*

*This book comprises the select proceedings of the International Conference on Recent Advances in Civil Engineering (ICRACE) 2020, held at the Cochin University of Science and Technology, Cochin, Kerala, India. The book focuses on latest research in different areas of civil engineering and lays special emphasis on sustainable construction practices. It is divided into seven major themes: (i) Modern materials and sustainable construction, (ii) Environmental engineering and management, (iii) Geotechnical engineering, (iv) Health, safety and environment, (v) Irrigation, water resources and management, (vi) Structural Engineering, and (vii) Transportation engineering and traffic planning. Given the range of the topics covered, this book can be useful for students, scholars and professionals interested in the different sub-disciplines of civil engineering.*

*Advances in Resource-saving Technologies and Materials in Civil and Environmental Engineering*

*Proceedings of the Second International Conference of Construction, Infrastructure, and Materials*

*Principles of Applied Civil Engineering Design*

*Select Proceedings of ICSCPE 2019*

*Lecture Notes*

*Modern Applications of Geotechnical Engineering and Construction*

*Selected Papers*

*Advances in Sustainable Construction Materials*

*This book gathers peer-reviewed contributions presented at the International Conference on Structural Engineering and Construction Management (SECON’21), held on 12-15 May 2021. The meeting served as a fertile platform for discussion, sharing sound knowledge and introducing novel ideas on issues related to sustainable construction and design for the future. The respective contributions address various aspects of numerical modeling and simulation in structural engineering, structural dynamics and earthquake engineering, advanced analysis and design of foundations, BIM, building energy management, and technical project management. Accordingly, the book offers a valuable, up-to-date tool and essential overview of the subject for scientists and practitioners alike, and will inspire further investigations and research. .*

*pe="" This book comprises select proceedings of the First International Conference on Urban Science and Engineering. The focus of the conference was on the milieu of urban planning while applying technology which ensures better urban life, coupled with sensitivity to depleting natural resources and focus on sustainable development. The contents focus on sustainable infrastructure, mobility and planning, urban water and sanitation, green construction materials, optimization and innovation in structural design, and more. This book aims to provide up-to-date and authoritative knowledge from both industrial and academic worlds, sharing best practice in the field of urban science and engineering. This book is beneficial to students, researchers, and professionals working in the field of smart materials and sustainable development. ^*

*This book presents selected papers from the 4th Conference of the Transportation Research Group of India. It provides a comprehensive analysis of themes spanning the field of transportation encompassing economics, financial management, social equity, green technologies, operations research, big data analysis, econometrics and structural mechanics. This volume will be of interest to researchers, educators, practitioners, managers, and policy-makers world-wide.*

*This book comprises select proceedings of the International Conference on Sustainable Civil Engineering Practices (ICSCPE 2019). It covers several important aspects of sustainable civil engineering practices dealing with effective waste and material management, natural resources, industrial products, energy, food, transportation and shelter, while conserving and protecting the environmental quality and the natural resource base essential for future development. The book also discusses engineering solutions to sustainable development and green design issues. Special emphasis is given on qualitative guidelines for generation, treatment, handling, transport, disposal and recycling of wastes. The book is intended as a practice-oriented reference guide for researchers and practitioners, and will be useful for all working in sustainable civil engineering related fields.*

*Introduction to Sanitary Engineering*

*Advances in Civil Engineering Materials*

*Artificial Intelligence in Construction Engineering and Management*

*Transportation Research*

*Proceedings of ICUSE 2020*

*Smart Technologies for Sustainable Development*

*10th International Conference on FRP Composites in Civil Engineering*

*GCEC 2017*

*This book presents selected articles from the 4th International Conference on Architecture and Civil Engineering 2020, held in Kuala Lumpur, Malaysia. Written by leading researchers and industry professionals, the papers highlight recent advances and address the current issues in the fields of civil engineering and architecture.*

*This volume highlights the latest advances, innovations, and applications in the field of FRP composites and structures, as presented by leading international researchers and engineers at the 10th International Conference on Fibre-Reinforced Polymer (FRP) Composites in Civil Engineering (CICE), held in Istanbul, Turkey on December 8-10, 2021. It covers a diverse range of topics such as All FRP structures; Bond and interfacial stresses; Concrete-filled FRP tubular members; Concrete structures reinforced or pre-stressed with FRP; Confinement; Design issues/guidelines; Durability and long-term performance; Fiber-reinforced blast loading; FRP as internal reinforcement; Hybrid structures of FRP and other materials; Materials and products; Seismic retrofit of structures; Strengthening of concrete, steel, masonry and timber structures, and Testing. The contributions, which were selected by means of a rigorous international peer-review process, present a wealth of exciting ideas that will open novel research directions and foster multidisciplinary collaboration among different specialists.*

*This book presents contributions on new technologies in building and construction. Buildings are complex elements that impact environment significantly. The sustainability of this sector requires a holistic and multidisciplinary approach that allows adequate strategies to be established to reduce its environmental impact. This heterogeneity is represented in these chapters, which have been developed by researchers from different countries. The book is divided into three sections: (i) analysis, (ii) design and modeling, and (iii) solutions. The book chapters together represent an advance in current knowledge*

*about new technologies in building and construction, crucial for researchers, engineers, architects, policy makers, and stakeholders.*

*pe="" This book contains select papers from the International Conference on Geotechnical Engineering Iraq discussing the challenges, opportunities, and problems of application of geotechnical engineering in projects. The contents cover a wide spectrum of themes in geotechnical engineering, including but not limited to sustainability & geotechnical engineering, modeling of foundations & slope stability, seismic analysis & soil mechanics, construction materials, and construction & management of projects. This volume will prove a valuable resource for practicing engineers and researchers in the field of geotechnical engineering, structural engineering, and construction and management of projects. ^*

*Selected Papers of the ICACE 2018 Held in Batu Ferringhi, Penang Malaysia on 9th-10th May 2018*

*Sustainable Civil Engineering Practices*

*Advances in Civil Engineering*

*Select Proceedings of 7th ICRAGEE 2020*

*XXX Russian-Polish-Slovak Seminar Theoretical Foundation of Civil Engineering (RSP 2021)*

*18th International Probabilistic Workshop*

*Energy and Geotechnics*

*Select Proceedings of SMTS 2019*

*This book compiles papers presented during the 5th International Conference on Sustainable Civil Engineering Structures and Construction Materials (SCESCM) held virtually in December 2020. This is the fifth edition of this conference series; the theme for the 5th SCESCM is “Transforming the World, Foster the Sustainable Development Goals (SDGs),” and it focuses on various issues, novel findings, as well as developments in the area of civil and infrastructure, conforming to the SDGs.*

*This book caters to postgraduate students, researchers, and practitioners involved in advocating and embedding sustainability in various phases of design, construction and maintenance of civil engineering structures and infrastructure facilities.*

*This book contains the proceedings of the 3rd International Conference on Sustainability in Civil Engineering, ICSCSE 2020, held on 26-27 November 2020, in Hanoi, Vietnam. It presents the expertise of scientists and engineers in academia and industry in the field of bridge and highway engineering, construction materials, environmental engineering, engineering in industry 4.0, geotechnical engineering, structural damage detection and health monitoring, structural engineering,*

*geographic information system engineering, traffic, transportation and logistics engineering, water resources, estuary and coastal engineering.*

*This book gathers the proceedings of the 1st Global Civil Engineering Conference, GCEC 2017, held in Kuala Lumpur, Malaysia, on July 25–28, 2017. It highlights how state-of-the-art techniques and tools in various disciplines of Civil Engineering are being applied to solve real-world problems. The book presents interdisciplinary research, experimental and/or theoretical studies yielding new insights that will advance civil engineering methods. The scope of the book spans the following areas: Structural, Water Resources, Geotechnical, Construction, Transportation Engineering and Geospatial Engineering applications.*

*Proceedings of CTRG 2017*

*Proceedings of 12th International Conference in Road and Airfield Pavement Technology, 2021  
Road and Airfield Pavement Technology  
SDMA 2021, 4-5 August, Ghent University, Belgium  
ICSCE 2020, 26-27 November, Hanoi, Vietnam  
Proceedings of AICCE'19  
Urban Science and Engineering  
Probabilistic Design: Risk and Reliability Analysis in Civil Engineering*