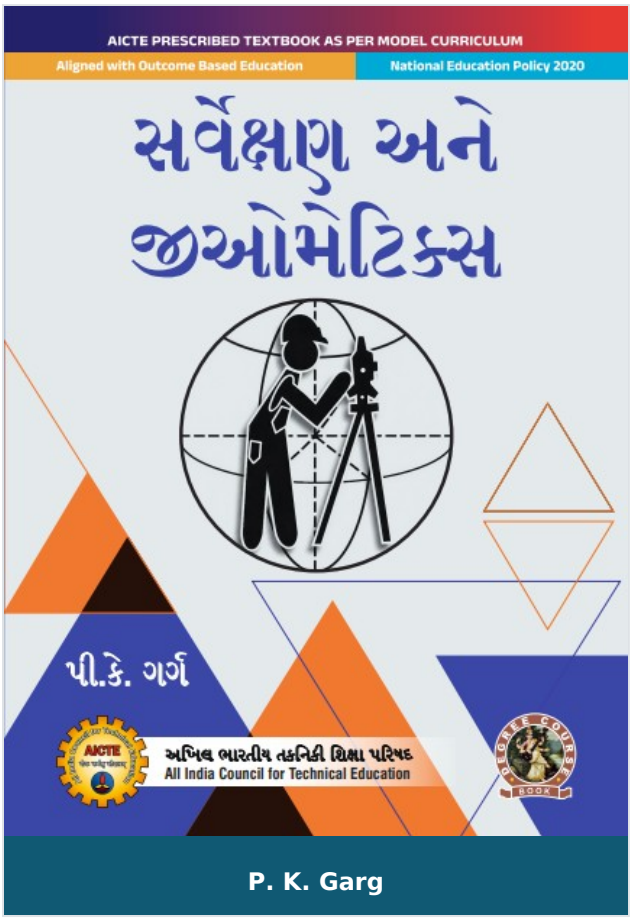


TEXTBOOK ON SURVEYING AND GEOMATICS

Author :	P. K. Garg
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Product Description

Textbook On Surveying and Geomatics

The book provides the fundamental principles and theory of various equipment and techniques used in surveying and geomatics engineering. The fast developments which have taken place in field data collection methods and mapping techniques are also covered in the book. The book is intended to guide and help students and researches understanding of surveying and geometrics tools and techniques. It provides insights to the subject matter aligned with the latest model curriculum of the AICTE, followed by the concept of outcome-based education as per the New Education Policy (NEP)-2020.

Salient features:

- Content of the book aligned with the mapping course outcomes, programs and Units Outcomes.
- In the beginning of each unit learning outcomes are listed to make the student understand what is expected out of him/her after completing that unit.
- Book provides lots of recent information, interesting facts, QR code for E-resources, QR code for use of ICT, projects, group discussion etc.
- Student and teacher centric subject materials included in book with balanced and chronological manner.
- Figures, tables, and software screen shots are inserted to improve clarity of the topics.
- Apart from essential information a ‘know more’ section is also provided in each unit to extend the learning beyond syllabus.
- Short questions, objective questions and long answer exercises are given for practice of students after every chapter.

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- Solved and unsolved problems including numerical examples are solved with systematic steps.

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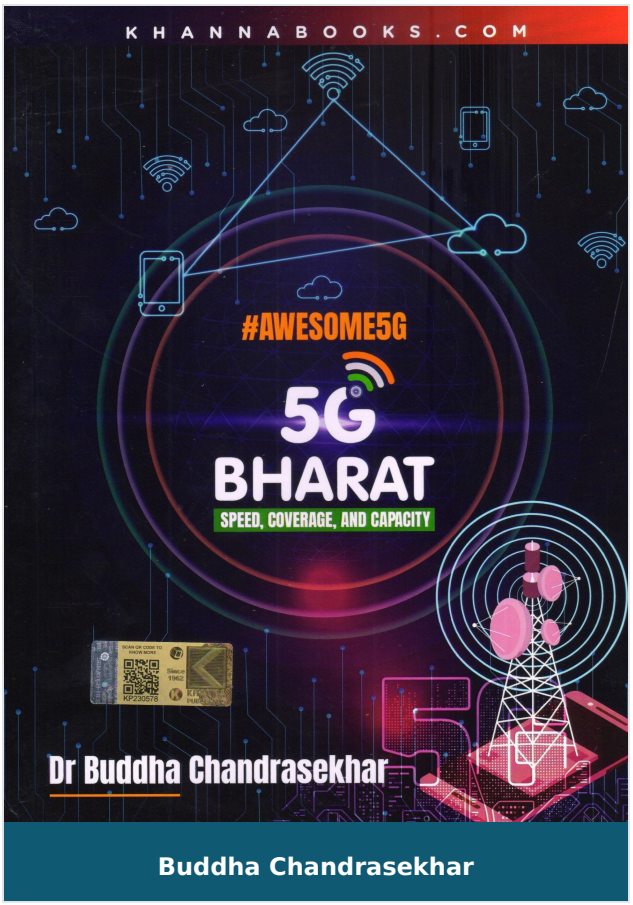
P. K. Garg

P.K. GARG Professor, Civil Engineering Department Indian Institute of Technology Roorkee, Roorkee & Former, Vice Chancellor Uttarakhand Technical University, Dehardun

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Buddha Chandrasekhar

#Awesome5G- 5G Bharat

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Publisher :	Khanna Publishing House
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Condition Type :	New
Country Origin :	India

Product Description

#Awesome5G- 5G Bharat Speed, Cover, and Capacity. Experience the potential of 5g to revolutionize education, skill development, and job creation while empowering farmers, healthcare, Railways, BFSI and promoting social inclusion. Discover the transformative power of 5G in reshaping India’s economic landscape and empowering its diverse communities.

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- How 5G can Empower Bharat Railways
- How 5G Can Empower Banking, Financial Services and Insurance.

Author

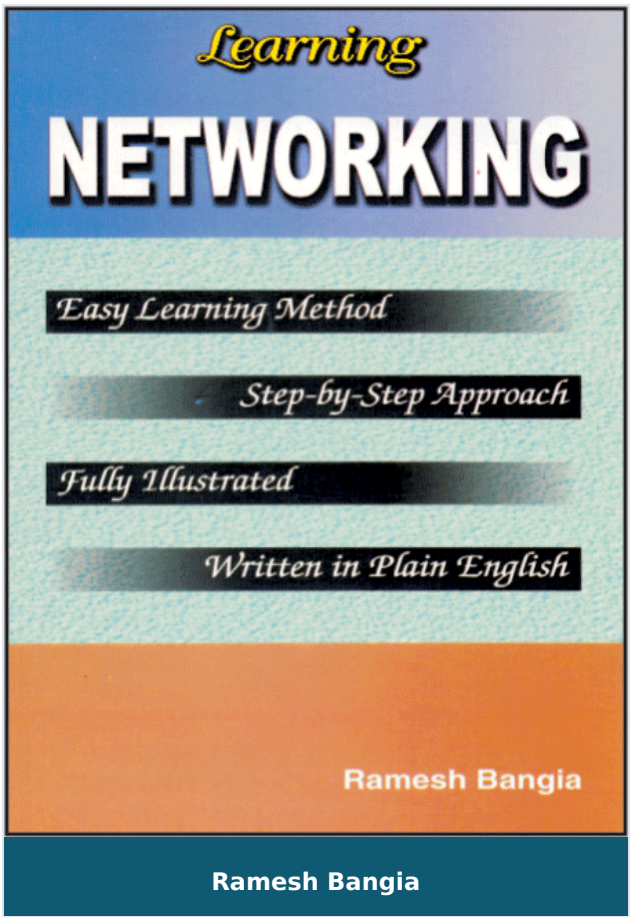
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Ramesh Bangia

Learning Networking

Author :	Ramesh Bangia
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Product Description

Learning of a software is both easy and difficult. It depends up to what level you planning to learn. If you are learning only for the working use, then it is very easy. But, when you try to go deep into it, then you realize how difficult it is to master it. Networking is such a vast subject that it will take a lot of time to understand it fully. This book has been written in mind to make you aware of the options available in the software and how they can be used. It is like telling the child about the steps and stairs. You are the one who is to climb the stair. This book will just guide you how to use the stairs.

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- Designing Your Network
- Configuring Windows for Networking
- Setting up Hardware for Internet
- Getting Connected to Internet
- Networking Software
- Glossary of Networking
- Questions

Author

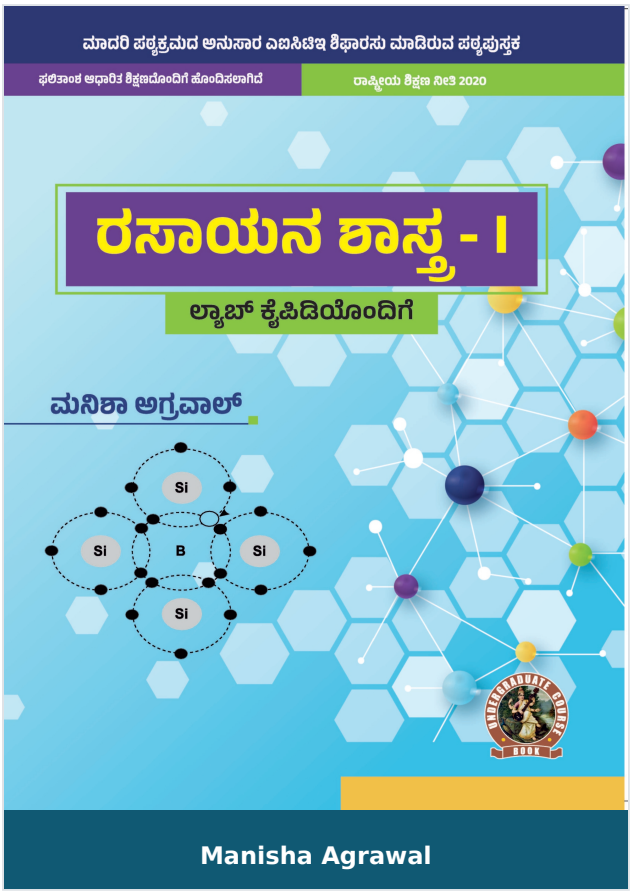
Ramesh Bangia

Ramesh Bangia, has been writing computer books on various topics. He has written books for Schools. Training Institutes, Technical Universities, Distance Education Programs, Colleges and General. His tally of books exceeds 500 in number. Trained both in India and Abroad and having studied at IIT Delhi, he becomes automatic choice for most of the publishers in India. Though based in Delhi, his books are popular all over India and are even exported to Middle Ease and African countries.

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Chemistry I (with Lab Manual)

Author :	Manisha Agrawal
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Condition Type :	New
Country Origin :	India

Product Description

“Chemistry-I” is a compulsory paper for the first year Undergraduate course in Engineering & Technology. Syllabus of this book is strictly aligned as per model curriculum of AICTE, and academic content is amalgamated with the concept of outcome based education.

Book covers seven topics-Atomic and molecular structure, Spectroscopic Technique and applications, Inter-molecular Forces and Potential Energy Surfaces, Use of Free Energy in Chemical Equilibrium, Periodic Properties, Stereo-chemistry, Organic Reactions and Synthesis of Drug Molecules. Each topic is written is easy and lucid manner. Every chapter contains a set of exercise at the end of each unit to test student’s comprehension.

Salient Features:

1. Content of the book aligned with the mapping of Course Outcomes, Programs Outcomes and Unit Outcomes.

2. Book Provides lots of recent information, interesting facts, QR Code for E-resources, QR Code for us of ICT, Projects group discussion etc.

3. Students and teacher centric subject materials included in book with balanced and chronological manner.

4. Figures, tables, chemical equations and comparative charts are inserted to improve clarity of the topics.

5. Short questions, objective questions and long answer exercises are given for practice of students after every chapter.

6. Solved and unsolved problems including numerical examples are solved with systematic steps.

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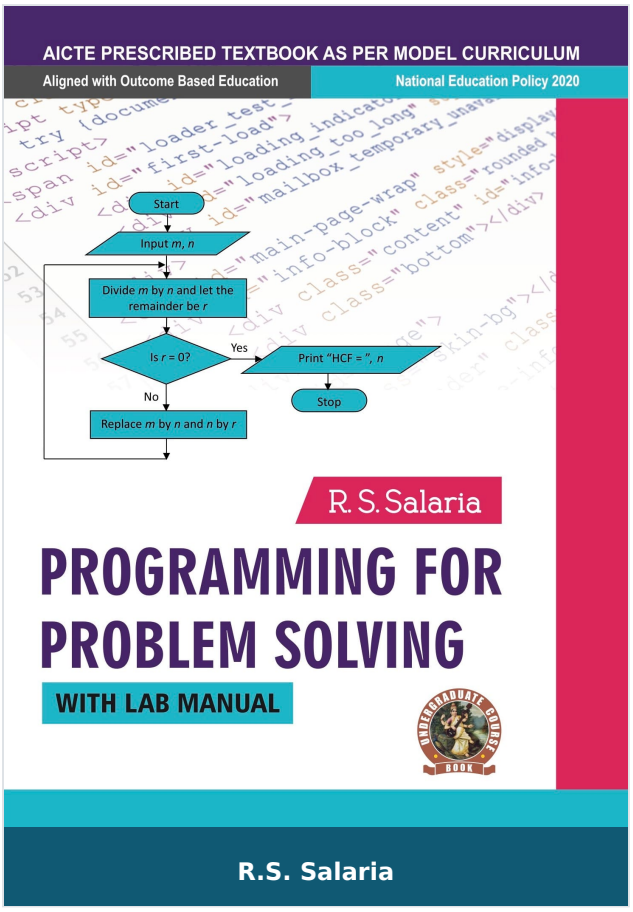
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Manisha Agrawal Dr. Manisha Agarwal is Dean, Basic Sciences at Chhattisgarh Swami Vivekanand Technical University Bhilai. Professor and head, Department of Chemistry at Rungta College of Engineering & Technology, Bhilai, (C.G.). She completed Ph. D. from Pt. Ravishankar Shukla University, Raipur in 1999. Since then she has been engaged in teaching and research. Dr. Manisha has authored several papers which have been published in SCI indexed International and National journals. She has organised more than 10 Conferences and workshops as convener among them four were International Conferences. She has credited five books as author, three patents as inventor and applicant and six Research Project Grants as Principal Investigator from Government Funding agencies like AICTE, CCOST and CSVTU. She has supervised 5 M. Phil. Students, 12 BE and Diploma students. Presently 6 research scholars are perusing Ph. D. under her supervision.

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Programming for Problem Solving (with Lab Manual)

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Country Origin :	India

Product Description

This textbook is designed as per the model curriculum of AICTE for the first year students of all branches of undergraduate program in Engineering & Technology (BE/B. Tech). The subject of programming for problem Solving aims at developing problem solving skills among the students and the skills to create programs in C language for their implementation. This book emphasizes to empower the students to grasp the skills required for problem solving and to develop deep understanding of the constructs of C language. These aspects of the subject are well illustrated through enormous solved programming problems.

Salient Features:

1. Simple and lucid language that enables students to grasp the subject.
2. Demonstrates the elegant programming style.
3. 165+ ready to run programs for reference and to illustrate the program development process.
4. 135+ Short answer type questions to provide an opportunity for self-assessment of the fundamental concepts learned by answering them precisely.
5. 165+ multiple choice questions to provide an opportunity to synthesize the fundamental concepts.
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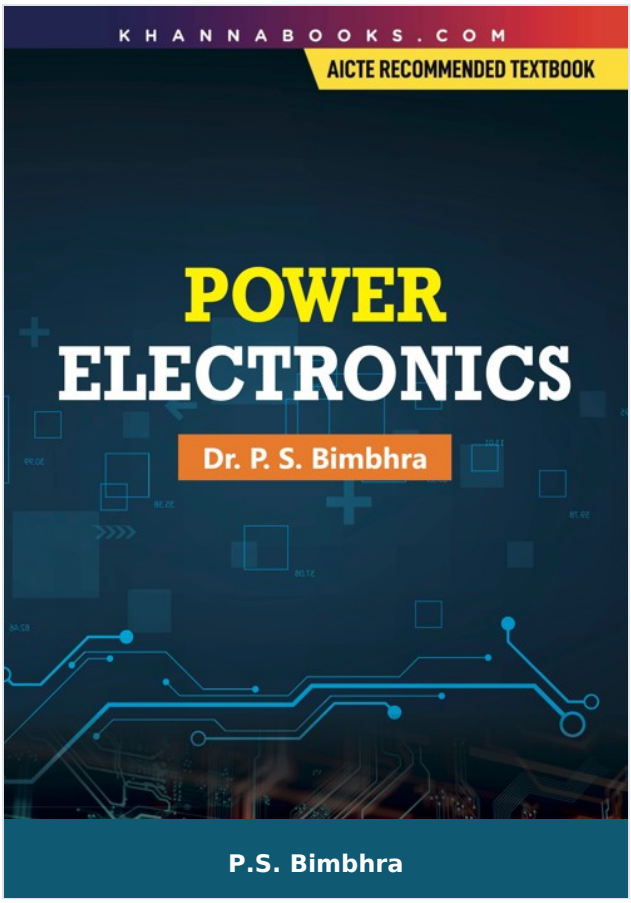
R.S. Salaria

Prof. R.S. Salaria is a superior teacher, a prolific author and a great motivator. He is an alumnus of IIT, Delhi. He is a Certified Software Quality professional by Ministry of Information Technology, Govt. of India: Sun Certified Programmer as well as Sun Certified Trainer by SUN Microsystems. He is a life member of computer society of India, Mumbai: Institution of Electronics and Telecommunication Engineers, New Delhi: Indian Society for Technical Education, New Delhi: Punjab Academy of Sciences, Patiala. Presently, he is talking initiatives to Sensitize the citizens of this great country about their fundamental responsibilities towards society and seeking their contributions to make the society a wonderful place for happy and peaceful living. </p

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Power Electronics

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Product Description

This book is designed to sever a textbook for the students of engineering studying a course on power Electronics. It provides a lucid and comprehensive treatment of the topics covered in the book.

A large number of illustrative figures and a wide variety of worked examples add to the clarity of subject mater. This book would be found suitable as a textbook for the students pursuing courses in the areas of the Electrical, Electronics, Instrumentation, Telecommunications and Mechatronics.

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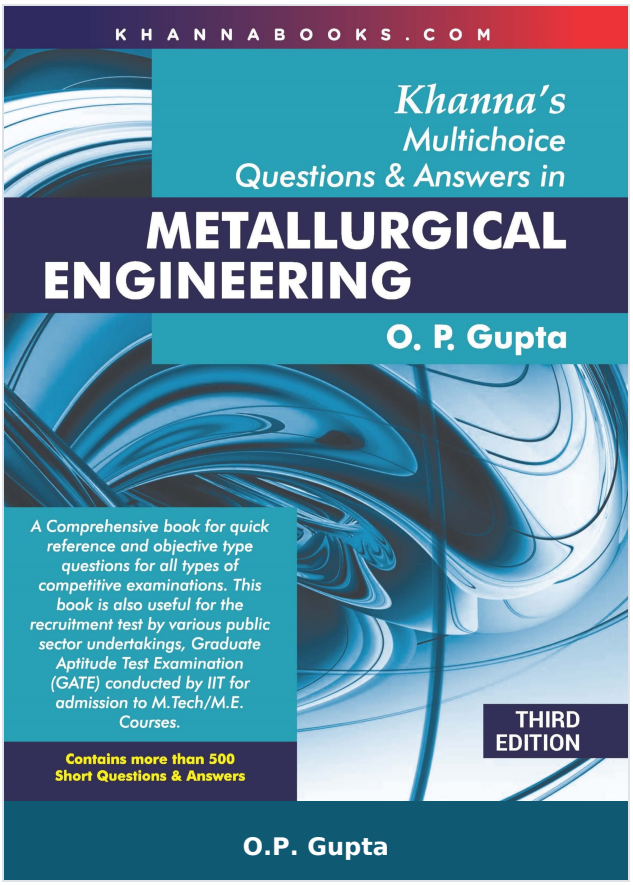
P.S. Bimbhra

Dr. P.S. Bimbhra retired as a professor of Electrical and Electronics Engineering from T.I.E.T. Patiala. A graduate of Punjab Engineering College, Chandigarh, he received his M.E. (Hons.) and Ph.D. from IIT Roorkee. He is fellow of the Institution of Engineers and a life member of ISTE. His areas of current interests include Electrical Machines, Power Electronics and Electric Drives.

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Khanna's Multichoice Questions & Answers in Metallurgical Engineering

Author :	O.P. Gupta
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Product Description

This book is meant for diploma & degree student of metallurgical engineering for their academic programs as well as for various competitive examination for securing jobs. This book has been structured in three section. First section contains multiple choice type questions of various subjects of metallurgical engineering. Second section contains chapter wise question of GATE (Graduate Aptitude Test in Engineering) from 1991 to 2016. Third section contains SHORT QUESTIONS & ANSWERS in METALLURGICAL ENGINEERING. Fourth section contains APPENDICES containing Glossary of terms related to Metallurgical Engineering and Q&A of GATE-2017. This book has been designed to serve as "Hand Book of Metallurgical Engineering" which will be useful for various competitive examinations for recruitment in various public sector & Private Sector companies as well as for GATE Examination. Question have been arranged subject wise and answers are given at the bottom of the page.

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- Electrometallurgy and Corrosion
- Metallurgical Testing &Inspection
- Metallurgical Analysis
- Physics of Metals
- Metallurgical Thermodynamics
- Metallurgical Kinetics
- Miscellaneous Questions
- Section B – MCQ of GATE (Graduate Aptitude Test in Engineering)

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- General Metallurgy
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- Glossary

Author

O.P. Gupta

O.P. Gupta Om Prakash Gupta is basically being a chemical engineer, he has a practising experience of efficient Ennergy management and HR functions in steel Industry for more than three decades. privileged to be the youngest writer of technical books in the country (for he had written his first book at the age of 24 years while doing M. Tech. at I.I.T

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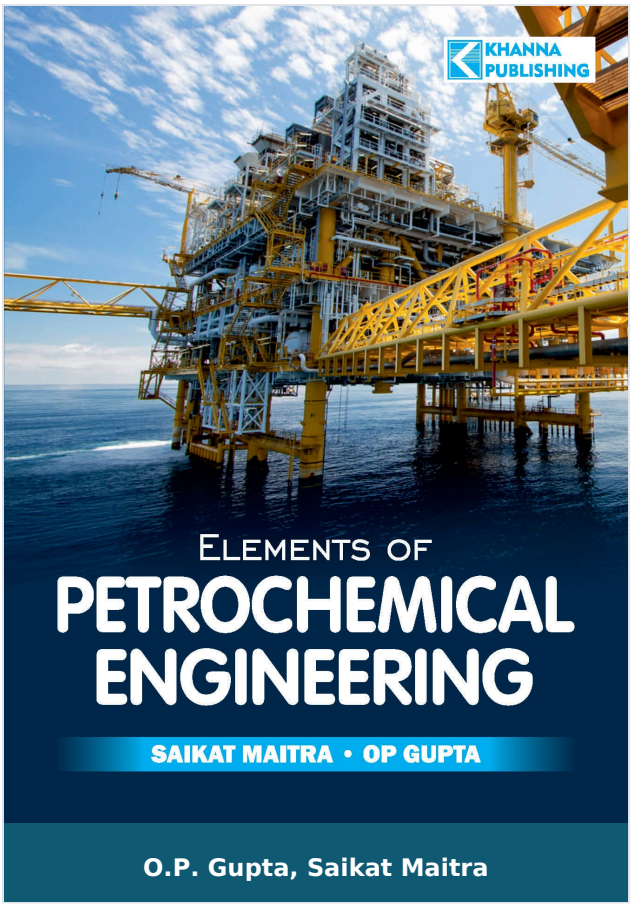
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kanpur in 1979), he has authored many frontline books for engineering students. besides, being the regular faculty member in technical courses for Management Trainees (Technical), he has also visited england and france on a study tour sponsored by United Nations Development Programme (UNDP) to study the scope of energy conservation in steel plants in 1987.

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Elements of Petrochemical Engineering

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Product Description

Elements of Petrochemical Engineering book is meant for the students, teachers and practicing Engineers. This book contains the manufacture, properties and applications of important petrochemicals. Important information's about feedstocks and applications of petrochemical derived products, status of Indian Petrochemical Industry and environment standards for the petrochemical plant are given in the appendices. It also contains short questions and answers and multiple choice questions and answers drawn from examination papers of various engineering colleges for the benefits of the students.

The book is targeted to benefit the following :

Diploma in Engineering Students, Degree in Engineering Students, AMIE AMIIM, AMIICHE students, Faculty members and teaching staff, Practicing Engineers/Professionals. Latest and updated information/ data/statistics pertaining to the subject matter has been included in the edition for the benefit of the readers.

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- Production of Benzene by Hydrodealkylation of Tolune
- Manufacture of Xylene
- Manufacture of Phenol from Cumene
- Manufacture of Phenol from Toluene Oxidation
- Manufacture of Phenol from Hydrochlorination of Benzene
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- production of Styrene from Benzene
- Production of Phthalmic Anhydride from Napthalene or O-Xylene
- Production of Maleic Anhydride (C
-) from Benzene
- Production of Terephthalic Acid (TPA) & Dimethyl Terephthalate (DMT)
- Production of Toulene Di-Isocyanate (TDI)
- Fundamentals of Polymerisation Technology
- Polymer Processing Technologies
- Appendix A : Petrochemicals Feedstocks, Products & Applications
- Appendix B : Uses of Petrochemicals in Various Sectors
- Appendix C : All About Indian Petrochemical Industry
- Appendix D : Indian National Emission Standards for Petrochemical Plants
- Appendix E : Glossary of Terms Related to Petrochemical Engineering
- Appendix F : Bibliography/References/Further Reading
- Appendix G : Objective Type Questions and Answers
- Appendix H : Short Questions and Answers

Author

O.P. Gupta

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O.P. Gupta Om Prakash Gupta is basically being a chemical engineer, he has a practising experience of efficient Ennergy management and HR functions in steel Industry for more than three decades. privileged to be the youngest writer of technical books in the country (for he had written his first book at the age of 24 years while doing M. Tech. at I.I.T kanpur in 1979), he has authored many frontline books for engineering students. besides, being the regular faculty member in technical courses for Management Trainees (Technical), he has also visited england and france on a study tour sponsored by United Nations Development Programme (UNDP) to study the scope of energy conservation in steel plants in 1987.

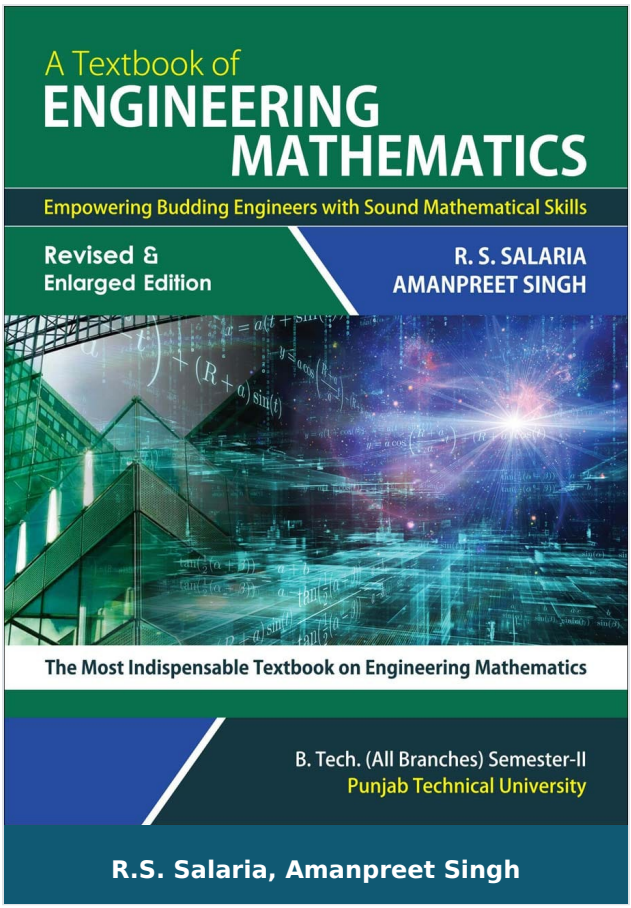
Saikat Maitra

Prof. Saikat Maitra is presently working as the Vice Chancellor of Maulana Abul Kalam Azad University of Technology, West Bengal (formerly West Bengal University of Technology). He did his B.Sc (Honours in Chemistry) from the Presidency Colleges, Kolkata, B.Tech, M.Tech and Ph.D in Chemical Technology from the University of Calcutta. He is a Chartered Chemical Engineer and Fellow of Institute of Engineers (India). Prof. Maitra earlier worked as Professor and Principal-in-Charge at Government College of Engineering; Ceramic Technology, Associate Professor at University Technology Petronas, Malasiya and as Scientist at Central Fuel Research Institute, Dhanbad. He has worked in industries too. Prof. Maitra published 150 research papers in different national & international journals, presented 60 papers in different conferences, filed two patents, authored three books and three book chapters. He has guided twelve Ph.D students, completed several funded research projects, organized several training programmes and workshops. He visited many countries like US, Australia, Italy, Malasiya, Singapore, Thailand, Bangladesh, Baharain etc for delivering lecturers.

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A Textbook of Engineering Mathematics (PTU-II)

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The subject of Engineering Mathematics is an integral part of the course curriculum of bachelor of Engineering/Technology (BE/B. Tech) Program of All Indian Universities, and is taught in first and/or second semester(s). The present state of teaching and learning of Mathematics is not that encouraging. A lot has to be done on both the fronts.

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- Complex Numbers

Author

R.S. Salaria

Prof. R.S. Salaria is a superior teacher, a prolific author and a great motivator. He is an alumnus of IIT, Delhi. He is a Certified Software Quality professional by Ministry of Information Technology, Govt. of India: Sun Certified Programmer as well as Sun Certified Trainer by SUN Microsystems. He is a life member of computer society of India, Mumbai: Institution of Electronics and Telecommunication Engineers, New Delhi: Indian Society for Technical Education, New Delhi: Punjab Academy of Sciences, Patiala. Presently, he is talking initiatives to Sensitize the citizens of this great country about their fundamental responsibilities towards society and seeking their contributions to make the society a wonderful place for happy and peaceful living. </p

Amanpreet Singh

Amanpreet Singh Amanpreet Singh SGTB Khalsha College, Anandpur Sahib, Formerly with Rayat-Bahra Institute of Engineering& Nano Technology, Hoshiarpur.

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Mathematics - I

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Author

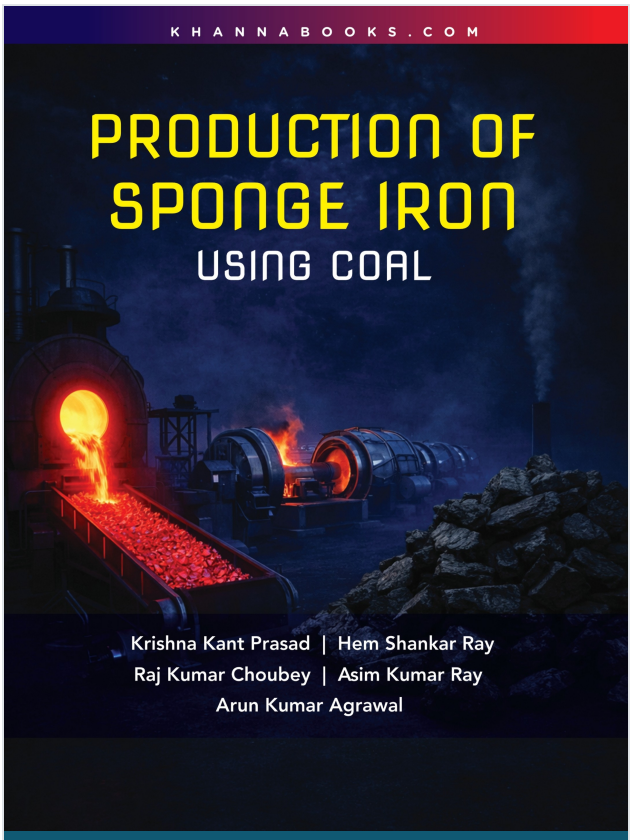
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Krishna Kant Prasad, Hem Shankar Ray, Raj Kumar Choubey, Asim Kumar Ray, Arun Kumar Agarwal

Production of Sponge Iron Using COAL

Author :	Krishna Kant Prasad, Hem Shankar Ray, Raj Kumar Choubey, Asim Kumar Ray, Arun Kumar Agarwal
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Product Description

Production of Sponge Iron Using COAL

Production of Sponge Iron using Coal: Rotary Kiln, Tunnel Kiln and using Gas from Coal is a definitive technical guide that explores India's global leadership in the coal-based direct reduction of iron ore. While international markets often rely on gas-based shaft processes, this book highlights how India has pioneered and perfected the use of rotary kilns to utilize abundant, high-ash non-coking coal-resources often dismissed by foreign experts as "muck". The text provides an exhaustive analysis of the thermodynamic, kinetic, and aerodynamic principles that govern the solid-state reduction of iron oxides.

The book serves as a vital bridge between theoretical research and industrial application, documenting decades of expertise from leading metallurgists. It broadens the traditional focus on rotary kilns to include emerging commercial successes in tunnel kiln technology and coal gasification-based shaft furnaces. Beyond technical specifications, the authors connect modern engineering with India's ancient metallurgical heritage, such as the storied Iron Pillar of Delhi. This work is an essential resource for metallurgical students, researchers, industry professionals, and entrepreneurs seeking to understand the economic and technical nuances of sustainable ironmaking in coal-rich regions.

Salient Features

- Rotary Kiln Dominance: Detailed analysis of the rotary kiln's primary role in India, covering its versatility in processing lump hematite and its unique operational strengths and weaknesses.
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- Alternative Reduction Technologies: In-depth exploration of tunnel kilns as a viable solution for reducing magnetite and iron ore fines, filling a critical gap in traditional kiln operations.
- Coal Gasification Insights: Evaluation of the economic and technical feasibility of converting coal into reducing gas (CO and H) to supplement production in shaft furnaces.
- Resource Optimization: Strategies for utilizing high-ash Indian coal and recirculating char to enhance energy efficiency and reduce the environmental footprint of ironmaking.
- Practical Engineering Focus: Guidance on plant design, refractory management, and overcoming common industrial hurdles like accretion or "ring formation" inside kilns.
- Historical Contextualization: A unique addendum on India's ancient ironmaking legacy, offering a perspective on the longevity and evolution of sponge iron technology.
- Future-Ready Strategies: Critical projections on hydrogen-based ironmaking and the integration of sponge iron into blast furnaces to reduce costly metallurgical coke consumption.

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- Addendum

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Krishna Kant Prasad

Dr. Krishna Kant Prasad (born on 24th January 1945 in Bhagalpur, Bihar), after completing B.Sc. Hons. (Chem.) from Bhagalpur University, he did his B.E., M.E. and Ph.D. in Metallurgical Engineering from the Indian Institute of Science, Bangalore. After brief teaching stints at the Banaras Hindu University and MR Engineering College, Jaipur he joined R&D Division of Tata Steel, Jamshedpur in 1972. He moved to RDCIS, SAIL, Ranchi in 1981 as in-charge of R&D activities in the Sponge Iron Pilot Plant Complex and since then he was actively involved in steering R&D activities both in Sponge Iron Making and Alternate Iron Making areas. He retired from SAIL, in January 2006. Thereafter, he served as a visiting professor in the Department of Metallurgical Engineering in IT (now IIT), BHU, Varanasi, for two and then joined NITK (National Institute of Technology Karnataka) in Surathkal, initially as the Ministry of Steel Chair Professor, and then in various capacities - all equivalent to a visiting professor - for seven and a half years. Dr. Prasad has guided four Ph.D. students. He has to his credit over 130 research papers, five registered copyrights and holds two patents on sponge iron making. He has authored four books entitled Sponge Iron Making in Rotary Kiln, Chemical and Metallurgical Thermodynamics, Advances in Rotary Kiln Sponge Iron Plant and Integrated Iron- and Steelmaking. He has also edited two books - "Trends in Beneficiation and Agglomeration of Iron Ore' and 'Steel Plant Technologies: An Overview. He is life member of the Indian Institute of Metals, Electrochemical Society of India and the Computer Society of India. E-mail: kkpmprnc@gmail.com. Professor

Hem Shankar Ray

Hem Shankar Ray (born on 19th June 1940, Jabalpur, Madhya Pradesh) unfortunately left for his heavenly abode on 28th April 2023 just as the preparation of the manuscript

started. Prof. H. S. Ray is widely regarded as one of the greatest minds of the Indian scientific community and a very well-known name in the field of Extractive Metallurgy. He obtained his B.Tech. (Hons.) in Metallurgical Engineering from the Indian Institute of Technology, Kharagpur (1962) and M.A.Sc. and Ph.D. degrees from the University of Toronto, Canada (1963, 67). He was with I.I.T. Kanpur from 1967-80 as Lecturer and Asst. Professor. In between he served as Manager/Senior Technologist - Research and Development, Pilkington Research Centre, Lathom, England (1977-1979). He then served as Professor of Metallurgical Engineering (1980-1990) and Dean of Students Affairs (1988-90) at the Indian Institute of Technology, Kharagpur. Prof. Ray served the Regional Research Laboratory, Bhubaneswar (now IMMTD) as Director from 1990-2000 (two terms). On retirement he served as an Emeritus Scientist at the Central Glass and Ceramic Research Institute, Calcutta. He holds several patents including 2 U.S. patents to his credit. His areas of interest included thermal analysis, kinetics, extractive metallurgy, energy and R&D administration. He guided about 40 Ph.D. students and 20 M.Tech. students for their thesis work. He has published about 500 papers in reviewed journals and conference proceedings and over 26 books. He also edited 15 Conference proceedings and written about 50 technical reports. He also wrote numerous other non-technical articles, editorials, etc. Prof. Ray received several awards in recognition of his work and these include the National Metallurgists Day Award, G.D. Birla Award and two Kamani Gold Medals of the Indian Institute of Metals. He received the Distinguished Alumni award from IIT Kharagpur, which, interestingly, he shared that year with the Google CEO, Sundar Pichai. He served several companies and R&D laboratories as consultant or member of Boards/Research Councils. He was associated with several Professional Bodies and served as President, Indian Institute of Mineral Engineers and Indian Thermal Analysis Society; also, as a Vice President of the Millennium Institute of Energy and Environment Management and was an Editor of a popular science magazine Everyman's Science. He also served in several other institutions in various capacities. He was deeply involved with professional bodies such as IIM (Indian Institute of Metals),

MIEEM (Millennium Institute of Energy and Environmental Management), IAPQR (Indian Association for Productivity, Quality and Reliability) etc. and used to be regular and most 0sought-after speaker in their seminars/workshops. Apart from his stellar achievements in the world of academics, Prof Ray was well known for his interests and capabilities in other spheres of life such as Music and Art. His creative abilities spanned far and wide across writing books of both scientific and nonscientific nature, proficiency in several musical instruments like Guitar, Tabla, Violin and Esraj and painting in both oil and water colour. His office workspace at his home housed an eclectic mix of all forms of Arts. His most unusual interest was in Magic. He had a keen interest in the subject and built several magic tricks himself. He also performed in public as a professional magician. Prof Ray was a great friend to all his colleagues and students. His abilities to build positivity in all his circles made him stand out as an exceptional human being. His associations with people were lifelong. He held deep respect for all his relationships and loved nurturing the young and rising. From writing science fiction books for teenagers to help inculcate interest in core science in school to mentoring startups in science and tech and to helping and problem solving institutions to break through status quo to push forward, Prof Ray had pretty much done it all. He remained a self-driven human being with natural leaderships skills combined with motivating and inspiring others to rise, right till the end. Sri

Raj Kumar Choubey

Raj Kumar Choubey , was born on August 11, 1954 at Sikariya, Bhojpur, Bihar (unfortunately he passed away on February 19, 2024). He passed B.Sc. from the University of Burdwan in 1974 and Bachelor of Engineering from MREC (now MNIT) in Jaipur Rajasthan in the year 1980. He joined M/s Jaipur Metals and Electricals in 1980 and operated the first induction furnace of India. In 1982 he joined M/s Hindustan Motors and served till the year 2000. There he developed various grades of automobile grade steel and was a part of the team who fabricated the first Diesel Engine for automobiles in India. Thereafter he decided to be a start-up entrepreneur. His portfolio lately read: Owner -

Metcon Power Consultant & Engineers, Kolkata, having global clients base including Tata Steel and Jindal Steel. Director - Bhagwati Power & Steel Limited, Raipur, CG. Director - RNT Medicare Private Limited, Kolkata. Partner - Premier Hygienic Services, Kolkata. He involved himself in innovation and setting up commercial plants based on self developed technology for: Manufacturing DRI (Sponge Iron) from Mill Scale, DRI through Tunnel Kiln Technology, Development of Metallic Saggers for reduction of Iron Ore, Process for reduction of Chromite Ore at lower temperature, Extraction of liquid fuel from waste plastic, Recycling of Steel Plant wastes Development of Binders for agglomeration Address: Metcon House, North Bazar, Post: Andal - 713321, District: Paschim Bardhman, West Bengal. Email: choubey@metconpower.in, Website: www.metconpower.in. Dr.

Asim Kumar Ray

Dr. Asim Kumar Ray was born at Calcutta in 1952. He graduated with Honours in Chemical Engineering from Jadavpur University in 1974. He did his Masters in Chemical Engineering from IIT Kanpur and Ph. D. in Metallurgical Engineering from IIT Kharagpur. After a brief stay of about one and a half year each at Indian Iron and Steel Company, Burnpur and Indian Oil Corporation, he joined Research & Development Centre for Iron & Steel (RDCIS), SAIL, Ranchi in 1978. After a long stay at RDCIS, SAIL, Ranchi, he assumed charge of General Manager (Quality) at Durgapur Steel Plant (DSP), SAIL in 2008. Dr Ray was instrumental in commissioning Sponge Iron Pilot Plant and associated Process Research Laboratory and carried out R & D activities related to Sponge Iron & other Alternate Iron Making processes, Steelmaking and Continuous Casting. He established Computational Laboratory at RDCIS and carried out mathematical and physical simulation of different metallurgical processes. He steered several projects on process improvement and product development in all SAIL plants. Under his leadership, DSP had received several awards on Quality including prestigious Golden Peacock Award on Quality -2010 of Institution of Directors (IOD). Dr. Ray retired from SAIL in December 2012. Presently, Dr. Ray is with M/s Lechler (India) Pvt. Ltd. Dr. Ray has co-authored the Book on "Rotary

Kiln Sponge Ironmaking". He has to his credit about 140 research publications and three patents. Shri Arun Kumar Agrawal , born in 1963, is a 1985 metallurgical engineering graduate from the then Institute of Technology, Banaras Hindu University (IT-BHU - now IIT-BHU), Varanasi. He joined MECON Limited, Ranchi in the year 1986 as Management Trainee (Technical) after one year stint in Hindustan Aluminium Co. (Hindalco - Aditya Birla Group) at Renukoot in Uttar Pradesh. He joined the Iron Making Division of MECON and was deeply involved in the basic engineering and design, detailed engineering, consultancy and project management as well as site services of various Iron Making Projects particularly DR (Direct reduction) projects - both coal and gas based. In Blast Furnace area, he was the co-ordinator for NMDC Blast Furnace in Nagarnar and 1.2 mtpa Blast Furnace Complex of M/s PTKS, Indonesia. He was involved in engineering of a number of coal and gas-based DR projects, most prominent being world's first syngas-based DR plant in Angul for JSPL. He possesses over 37 years of varied and rich experiences in Iron and Steel technology, conceptualisation of projects along the entire value chain and development of process flow sheets, making and guiding the preparation of multitudes of reports, etc. Besides he has rendered expert services to Ministry of Steel (MOS) by being part of several committees, policy and norms formulation and their subsequent regulation as well as handling of diverse technical queries. In the process he immensely contributed to the development and growth of Indian Steel Industry. Shri Agrawal was deeply involved in all business verticals of MECON Limited, both technical & commercial. During his illustrious career, he displayed rare strategic insight and business acumen for enhancing company's business prospects. Shri Agrawal rose to the level of Director (Technical) of MECON in June, 2020 and continued for three years before superannuation in 2023. Under his leadership, a new Design Cell was created to develop specific tailor-made innovative designs and engineering solutions for new application and import substitutions. He was instrumental in launching of company's in-house prestigious quarterly technical journal "Techquest" to provide platform for sharing technical knowledge as well as unique design, engineering & project experiences and site based

solutions among the engineers to help them learn from each other's experience and make constant improvement in their subsequent endeavours.

Arun Kumar Agarwal

Dr. Krishna Kant Prasad (born on 24th January 1945 in Bhagalpur, Bihar), after completing B.Sc. Hons. (Chem.) from Bhagalpur University, he did his B.E., M.E. and Ph.D. in Metallurgical Engineering from the Indian Institute of Science, Bangalore. After brief teaching stints at the Banaras Hindu University and MR Engineering College, Jaipur he joined R&D Division of Tata Steel, Jamshedpur in 1972. He moved to RDCIS, SAIL, Ranchi in 1981 as in-charge of R&D activities in the Sponge Iron Pilot Plant Complex and since then he was actively involved in steering R&D activities both in Sponge Iron Making and Alternate Iron Making areas. He retired from SAIL, in January 2006. Thereafter, he served as a visiting professor in the Department of Metallurgical Engineering in IT (now IIT), BHU, Varanasi, for two and then joined NITK (National Institute of Technology Karnataka) in Surathkal, initially as the Ministry of Steel Chair Professor, and then in various capacities - all equivalent to a visiting professor - for seven and a half years. Dr. Prasad has guided four Ph.D. students. He has to his credit over 130 research papers, five registered copyrights and holds two patents on sponge iron making. He has authored four books entitled Sponge Iron Making in Rotary Kiln, Chemical and Metallurgical Thermodynamics, Advances in Rotary Kiln Sponge Iron Plant and Integrated Iron- and Steelmaking. He has also edited two books - "Trends in Beneficiation and Agglomeration of Iron Ore' and 'Steel Plant Technologies: An Overview. He is life member of the Indian Institute of Metals, Electrochemical Society of India and the Computer Society of India. E-mail: kkpmprnc@gmail.com. Professor Hem Shankar Ray (born on 19th June 1940, Jabalpur, Madhya Pradesh) unfortunately left for his heavenly abode on 28th April 2023 just as the preparation of the manuscript started. Prof. H. S. Ray is widely regarded as one of the greatest minds of the Indian scientific community and a very well-known name in the field of Extractive Metallurgy. He obtained his B.Tech. (Hons.) in Metallurgical Engineering

from the Indian Institute of Technology, Kharagpur (1962) and M.A.Sc. and Ph.D. degrees from the University of Toronto, Canada (1963, 67). He was with I.I.T. Kanpur from 1967-80 as Lecturer and Asst. Professor. In between he served as Manager/Senior Technologist - Research and Development, Pilkington Research Centre, Lathom, England (1977-1979). He then served as Professor of Metallurgical Engineering (1980-1990) and Dean of Students Affairs (1988-90) at the Indian Institute of Technology, Kharagpur. Prof. Ray served the Regional Research Laboratory, Bhubaneswar (now IMMTD) as Director from 1990-2000 (two terms). On retirement he served as an Emeritus Scientist at the Central Glass and Ceramic Research Institute, Calcutta. He holds several patents including 2 U.S. patents to his credit. His areas of interest included thermal analysis, kinetics, extractive metallurgy, energy and R&D administration. He guided about 40 Ph.D. students and 20 M.Tech. students for their thesis work. He has published about 500 papers in reviewed journals and conference proceedings and over 26 books. He also edited 15 Conference proceedings and written about 50 technical reports. He also wrote numerous other non-technical articles, editorials, etc. Prof. Ray received several awards in recognition of his work and these include the National Metallurgists Day Award, G.D. Birla Award and two Kamani Gold Medals of the Indian Institute of Metals. He received the Distinguished Alumni award from IIT Kharagpur, which, interestingly, he shared that year with the Google CEO, Sundar Pichai. He served several companies and R&D laboratories as consultant or member of Boards/Research Councils. He was associated with several Professional Bodies and served as President, Indian Institute of Mineral Engineers and Indian Thermal Analysis Society; also, as a Vice President of the Millennium Institute of Energy and Environment Management and was an Editor of a popular science magazine Everyman's Science. He also served in several other institutions in various capacities. He was deeply involved with professional bodies such as IIM (Indian Institute of Metals), MIEEM (Millennium Institute of Energy and Environmental Management), IAPQR (Indian Association for Productivity, Quality and Reliability) etc. and used to be regular and most 0sought-after speaker in their seminars/workshops. Apart from his stellar achievements in

the world of academics, Prof Ray was well known for his interests and capabilities in other spheres of life such as Music and Art. His creative abilities spanned far and wide across writing books of both scientific and nonscientific nature, proficiency in several musical instruments like Guitar, Tabla, Violin and Esraj and painting in both oil and water colour. His office workspace at his home housed an eclectic mix of all forms of Arts. His most unusual interest was in Magic. He had a keen interest in the subject and built several magic tricks himself. He also performed in public as a professional magician. Prof Ray was a great friend to all his colleagues and students. His abilities to build positivity in all his circles made him stand out as an exceptional human being. His associations with people were lifelong. He held deep respect for all his relationships and loved nurturing the young and rising. From writing science fiction books for teenagers to help inculcate interest in core science in school to mentoring startups in science and tech and to helping and problem solving institutions to break through status quo to push forward, Prof Ray had pretty much done it all. He remained a self-driven human being with natural leaderships skills combined with motivating and inspiring others to rise, right till the end. Sri Raj Kumar Choubey , was born on August 11, 1954 at Sikariya, Bhojpur, Bihar (unfortunately he passed away on February 19, 2024). He passed B.Sc. from the University of Burdwan in 1974 and Bachelor of Engineering from MREC (now MNIT) in Jaipur Rajasthan in the year 1980. He joined M/s Jaipur Metals and Electricals in 1980 and operated the first induction furnace of India. In 1982 he joined M/s Hindustan Motors and served till the year 2000. There he developed various grades of automobile grade steel and was a part of the team who fabricated the first Diesel Engine for automobiles in India. Thereafter he decided to be a start-up entrepreneur. His portfolio lately read: Owner - Metcon Power Consultant & Engineers, Kolkata, having global clients base including Tata Steel and Jindal Steel. Director - Bhagwati Power & Steel Limited, Raipur, CG. Director - RNT Medicare Private Limited, Kolkata. Partner - Premier Hygienic Services, Kolkata. He involved himself in innovation and setting up commercial plants based on self developed technology for: Manufacturing DRI (Sponge Iron) from Mill Scale, DRI through Tunnel Kiln Technology,

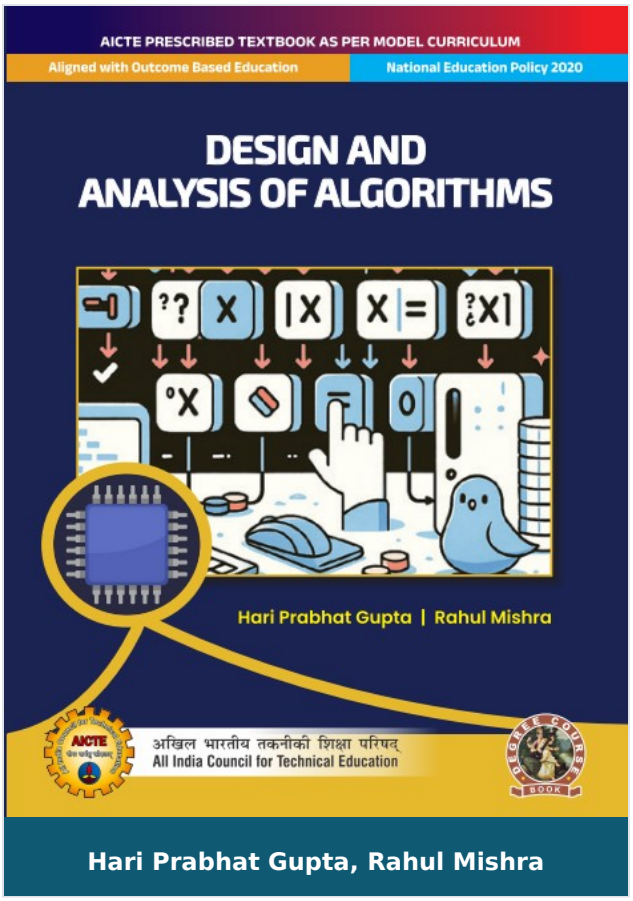
Development of Metallic Saggers for reduction of Iron Ore, Process for reduction of Chromite Ore at lower temperature, Extraction of liquid fuel from waste plastic, Recycling of Steel Plant wastes Development of Binders for agglomeration Address: Metcon House, North Bazar, Post: Andal - 713321, District: Paschim Bardhman, West Bengal. Email: choubey@metconpower.in, Website: www.metconpower.in. Dr. Asim Kumar Ray was born at Calcutta in 1952. He graduated with Honours in Chemical Engineering from Jadavpur University in 1974. He did his Masters in Chemical Engineering from IIT Kanpur and Ph. D. in Metallurgical Engineering from IIT Kharagpur. After a brief stay of about one and a half year each at Indian Iron and Steel Company, Burnpur and Indian Oil Corporation, he joined Research & Development Centre for Iron & Steel (RDCIS), SAIL, Ranchi in 1978. After a long stay at RDCIS, SAIL, Ranchi, he assumed charge of General Manager (Quality) at Durgapur Steel Plant (DSP), SAIL in 2008. Dr Ray was instrumental in commissioning Sponge Iron Pilot Plant and associated Process Research Laboratory and carried out R & D activities related to Sponge Iron & other Alternate Iron Making processes, Steelmaking and Continuous Casting. He established Computational Laboratory at RDCIS and carried out mathematical and physical simulation of different metallurgical processes. He steered several projects on process improvement and product development in all SAIL plants. Under his leadership, DSP had received several awards on Quality including prestigious Golden Peacock Award on Quality -2010 of Institution of Directors (IOD). Dr. Ray retired from SAIL in December 2012. Presently, Dr. Ray is with M/s Lechler (India) Pvt. Ltd. Dr. Ray has co-authored the Book on "Rotary Kiln Sponge Ironmaking". He has to his credit about 140 research publications and three patents. Shri Arun Kumar Agrawal , born in 1963, is a 1985 metallurgical engineering graduate from the then Institute of Technology, Banaras Hindu University (IT-BHU - now IIT-BHU), Varanasi. He joined MECON Limited, Ranchi in the year 1986 as Management Trainee (Technical) after one year stint in Hindustan Aluminium Co. (Hindalco - Aditya Birla Group) at Renukoot in Uttar Pradesh. He joined the Iron Making Division of MECON and was deeply involved in the basic engineering and design, detailed engineering, consultancy and project management as

well as site services of various Iron Making Projects particularly DR (Direct reduction) projects - both coal and gas based. In Blast Furnace area, he was the co-ordinator for NMDC Blast Furnace in Nagarnar and 1.2 mtpa Blast Furnace Complex of M/s PTKS, Indonesia. He was involved in engineering of a number of coal and gas-based DR projects, most prominent being world's first syngas-based DR plant in Angul for JSPL. He possesses over 37 years of varied and rich experiences in Iron and Steel technology, conceptualisation of projects along the entire value chain and development of process flow sheets, making and guiding the preparation of multitudes of reports, etc. Besides he has rendered expert services to Ministry of Steel (MOS) by being part of several committees, policy and norms formulation and their subsequent regulation as well as handling of diverse technical queries. In the process he immensely contributed to the development and growth of Indian Steel Industry. Shri Agrawal was deeply involved in all business verticals of MECON Limited, both technical & commercial. During his illustrious career, he displayed rare strategic insight and business acumen for enhancing company's business prospects. Shri Agrawal rose to the level of Director (Technical) of MECON in June, 2020 and continued for three years before superannuation in 2023. Under his leadership, a new Design Cell was created to develop specific tailor-made innovative designs and engineering solutions for new application and import substitutions. He was instrumental in launching of company's in-house prestigious quarterly technical journal "Techquest" to provide platform for sharing technical knowledge as well as unique design, engineering & project experiences and site based solutions among the engineers to help them learn from each other's experience and make constant improvement in their subsequent endeavours.

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Design and Analysis of Algorithms

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Design and Analysis of Algorithms

This book offers an in-depth exploration of designing and analysing algorithms. It covers topics such as algorithmic analysis, design principles, theoretical proofs, and practical applications. The content includes a logical example explaining the concepts, accompanied by a diverse range of solved and unsolved problems. Each problem is accompanied by step-by-step solutions, providing readers with a comprehensive understanding of algorithmic design and analysis. With its systematic approach, programming-based solutions, and thorough examples, this book serves as an ideal resource for those curious to learn basic to high level concept of algorithm design.

Salient Features:

- Content of the book aligned with the mapping of Course Outcomes, Programs Outcomes and Unit Outcomes.
- In the beginning of each unit learning outcomes are listed to make the student understand what is expected of him/ her after completing that unit.
- Book provides lots of recent information, interesting facts, logical examples, and solved programming exercises. Theorems and their proofs are added to provide detailed insight of analysis.
- Student and teacher centric subject material included in book in balanced and chronological manner.
- Figures, tables, and image-based elaborate examples are inserted to improve clarity of the topics. Salient Features:
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- Solved and Unsolved programming exercises are included in the appendix of the book.
- QR Code at the start of every chapter provide convenient access to electronic resources, including solutions to programming problems, discussions on key concepts, and project topics for students

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