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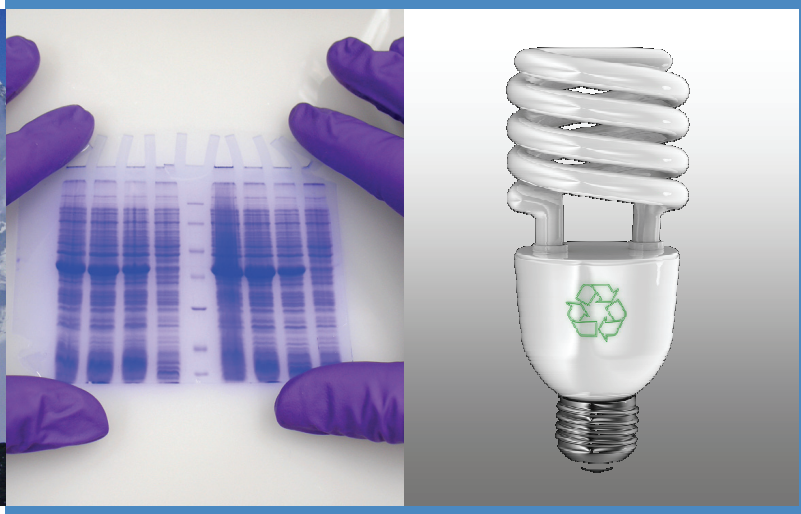

Reviews

A guide to publications in the Physical Sciences

The Higher Education Academy
Physical Sciences Centre
...enhancing the student experience in chemistry, physics, astronomy and forensic science within the university sector

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Volume 10 Issue 2

Reviews

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Editorial

This issue of *Reviews* has 27 reviews covering a wide range of topics in the physical sciences and more generally. Don't forget, as well as the contents list below, there is a subject index on the back cover.

COMMENTS PLEASE!

The Physical Sciences Centre is constantly looking for ways to improve the quality of support it provides to the UK higher education sector and is actively considering ways to evaluate its performance. If you have any comments you would like to pass on to us regarding this publication (or any other publication or service we provide) then please contact us at psc@hull.ac.uk or telephone to 01482 465418.

Roger Gladwin
Editor

In this issue...

Book reviews...

Advanced University Physics

Subject area
Chemistry, Materials Science, Chemical Physics, Physics, Chemical Engineering, Engineering

Description
Overview, specialist and general text for stand-alone physics and engineering modules and courses

Authors
Mircea S Rogalski and Stuart B Palmer

Publishers/Suppliers
Chapman & Hall/CRC Press (Taylor & Francis Group) <www.crcpress.com>

Date/Edition
2005/2nd edition

ISBN
978-1-58488-511-5

Level
Undergraduate, research, professional

Price
£35.99

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	****
Accuracy	*****

The book is considerable in its topic coverage and capacity but having standard dimensions. Presentational style is not at all intimidating despite some extremely specialised content and is seen by the reader as both eloquent and succinct. This level 2 or 3 degree level text has substantive coverage across the topics that comprise the subject in terms of the core areas of any 'university physics course' in a manner that is done 'as a fluid continuum' within forty seven chapters and over 1000 pages. Most students would not find the volume easy to 'pocket' around campus and between seminars and workshops. However, as befitting its purpose the book is large and covers a substantial fraction of any course. Of course there is always a trade-off between suitable content and use as a student referral aid and the book seems to get this just about right. There are many 'easy read' yet 'low content' universal guides as alternatives for students to refer to but that probably account for more reading and more weight. The book, and depending on the student's background and knowledge-base, cannot be considered to be particularly easy reading even for engaging students. The text notably relies on considerable foundation experience and *savoir-faire* in physics tools and platform understanding of complex maths, however, given this the text is a very comfortable read.

Formulation and ordering of chapters is also well considered and moves cogently in a well-stated direction via the pleasant insertion of issues of expanding contemporary interest, such as electrostatics (chapter 11), semiconductors (chapter 42) and superconductors (chapter 45). This book by Rogalski and Palmer assumes the position of combining pieces of abstract and pragmatic or empirical physics, really very tidily in the 'subject hopper' that is modern-day physics[1] and from an undergraduate student's perspective. The ease of usage for the course lecturer and intermediate or advanced researcher is also clear. From a student point of view, it is nice to see a textbook that is written from a grand topic perspective (and from a physics specialist duo) in an area customarily frequented more by mathematicians and 'mathematical' physicists[1-4] and their matter-of-fact presentational style. This does not often help convey complex themes with zeal. It is certainly clear that both Rogalski and Palmer are very experienced university teachers and active researchers, which helps to invigorate the book. The authors do an outstanding job of contextualising the field and the reading is made ever more engrossing and unambiguous by the clever use of elucidative graphs and simple but demonstrative schematics.

The technological impact via the 'worlds' of macroscopic and microscopic physics (and thus indirectly, societal value of 'physics' which, is secreted 'covertly' into the book) means both the student and advanced-research readers will enjoy the text and see its wider merits. Unfortunately, there is limited allusion to experimental methodologies and the relevance of wider aspects of physics to hint at state-of-the-art technical advances and the scope for physicist's involvement in for example, production of new 'designer' materials[3,5,6] and this is a little disappointing in modern-day materials aspects of physics.

There is no obvious diversion to what might be interesting use of informative images (black and white or colour) that seem particularly

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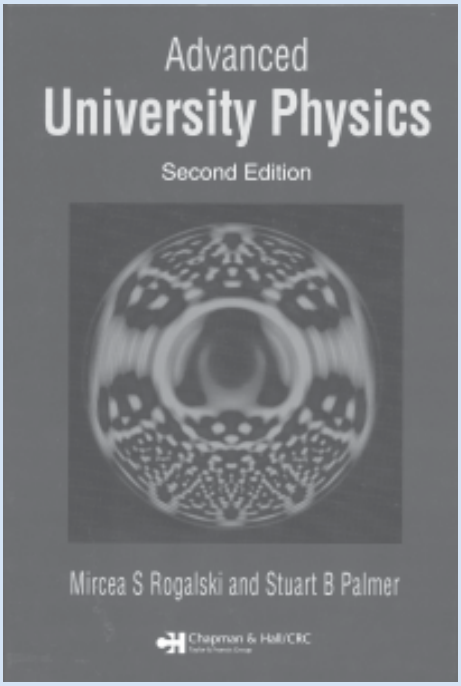
Advanced University Physics



From the publisher...

Advanced University Physics, Second Edition

By Mircea S. Rogalski, Stuart B. Palmer

In the first edition of Advanced University Physics, respected physicists Stuart Palmer and Mircea Rogalski built that bridge, and then guided readers across it. Serving as a supplement to the standard advanced physics syllabus, their work provided a succinct review of course material, while encouraging the development of a more cohesive understanding of theoretical physics. Now, after incorporating suggestions from many readers and colleagues, the two authors have revised and updated their original work to produce a second, even more poignant, edition.

978-1-58488-511-5 1024pp 2005 £35.99

relevant to certain topics such as interference and diffraction (chapters 18 and 19, respectively) eg Newton's interference fringes (p353) or crystalline materials (chapter 39), that feature regularly in equivalently used books in this area[1,3]. However, in stark contrast to the absence of dazzling images the book quite rightly and in unbiased fashion deals with explanation of concepts, rules and postulates in textual and graphical means and this is very satisfactory. The text does deal very consistently with standard topics in physics such as, states of matter, atoms, optics, statistical mechanics, nuclear physics, relativistic concepts, quantum mechanics, waves, electro-magnetism theoretical aspects and thermodynamics. In doing so, the text doubles-up as supporting physics and engineering at undergraduate (BA, BSc, BEng) and masters degree level (MPhys, MSc, MA, MEng, MRes, etc) or above (eg PhD, etc). The cost is somewhat inhibitory for a student purchase but not limiting for departmental/institutional expenditure and thus should be accessible to the student and in any case given the text's comprehensive coverage is subsumes the cost of several lesser teaching textbooks.

A number of alternative 'physics' books exist on the market[1,3,4,7,8] and the content is similar but this 'core text' is particularly suitable by virtue of covering materials and theories covered in 'a bitty form' elsewhere[7,8]. One significant merit of this book is that it contains all the taught or desired elements that are not presented under a single cover, elsewhere and this is rarely found. This book by Rogalski and Palmer is a satisfyingly good read because of its diversity of topics, praise-worthy précis-style clear explanatory text, and simple delineatory diagrams (eg Fig 4.6, Fig 13.2 and Fig in problem 18.2, among others). The book is also valuable in that just sufficient depth is given to most topics and both maths content and theoretical explanation and background are not over-the-top. The forty or more sections are drawn together logically and themes covered seem of real value at the beginning of the new era and 'gateway' of widespread pragmatic application of theoretical aspects of atomic and subatomic science[3,5-7]. The prerequisite knowledge required by the reader before commencement is not for the 'faint-hearted' and non-physicists may find the text a little daunting but this content is both expected and entirely desirable of a 'degree-calibre' upper-end university student of physics (or the equivalent). The text does indeed make use of extensive (ie virtually all sections within all chapters), but entirely indispensable descriptive[8] and explanatory maths and yet discusses concepts that are not trivialised by this or rendered as petty numerical exercises. Consequently, the book is only probably of real value to later-stage degree (level-3) and M-level education.

Continued on page 4

Advanced University Physics

Continued from page 3

The book hops between subjects ranging from crystal structure eg Bravais lattices (p771) to solid state magnetism (chapter 44) through wave equations and form (Chapters 15-22 and 28), mechanics (chapters 2, 6, 24, 25, 28 and 33), thermodynamics (chapters 7, 8 and 10) and passing through phase transitions (chapter 10). Yet, in doing so the text rather usefully traverses topics as wide-ranging as relativistic theory (chapters 4 and 5) and moves on to nuclear structure and nuclear dynamics (46 and 47) in a uniform treatment. The book is very interesting and with appropriate elements of hypothesising it also raises notions of the 'continuum mechanics' (throughout the text) and the properties of materials[2]. Exemplary topic coverage is provided by helpful descriptions of a 'cornucopia' of theories that will help students with problematic concepts such as, D'Alemberts Principle (p467), the Canonical Ensemble (p506), Fermi's Golden Rule (p733) and Cooper Pairs (p877).

The range of headings covered in this book by Mircea Rogalski and Stuart Palmer mean its use for physics courses is the norm and thus the expected uptake of the text is almost solely for teaching purposes. The book covers areas of The Brilloin zone (p829), the Ganov Factor (p937) and a whole section superbly illustrated on Schrödinger (chapter 30) that are conceptually pivotal and a cornerstone on this type of degree. A very insightful thematic coverage is the one dealing with problems posed and solutions provided (ubiquitous within the book) and specific to each sectional theme and the related hints for answers (and answers themselves) presented at a key point in the rear of the text.

Picking one brief section such as 'The Structure of Solids' (chapter 39), the chapter is written neatly and presents clear details of a range of theories and notions in light of continual new discoveries[7] and revelations. Themes such as X-ray diffraction patterns (p781) and packing of spheres (p774) are written neatly with both clarity and elegance. The section on the Unit Cell and Figure 39.4 (p773) is dosed with liberal amounts of formulary and description and illustration exactly 'in tune' with the guiding-hand needed by the 'degree' level reader. A textbook covering university physics would be incomplete without a section on superconductivity (p893) and the obvious 'springboard technology' inclusion of treatment on semiconductors (p829), which now feature in areas as diverse as polymer-based materials that sit in nanotechnology, chemosensor and diagnostic technology, smart building materials, microelectronics, household electronic products and many other technologies[3-6]. The book is student-friendly as it also navigates through some awkward notions, such as Bloch Theorem (p811), Bandwidth Theorem (p324), models of Atomic Degeneracy (pp641 and 699) and Paschen-Back effects (p686) without much fuss.

There are no apparent errors on reading of the book and the smooth flowing style suggests the work to be well considered and carefully reviewed as a second edition. The accuracy of description even in summary and the content is excellent and there are certainly no shortfalls in terms of providing worked examples for students (this is now seen as 'mandatory' for core teaching texts). Consequently, given the intended target audience for the text[1] such extensive worked examples seem both useful and very helpful to the student newcomer. This textbook is therefore, recommended for primarily M-level study or for final year (year 2 on some courses) degree physics.

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Applying Maths in the Chemical and Biomolecular Sciences: an example based approach

Subject area
Mathematics, Chemistry, Biology

Description
This text makes extensive use of applied examples to show how numerical and mathematical tools are used in real research, demonstrating to the student the importance of maths to their subject

Authors
Godfrey Beddard

Publishers/Suppliers
Oxford University Press
<ukcatalogue.oup.com/category/academic.do>

Date/Edition
2009/1st edition

ISBN
978-0-19-923091-4

Level
Undergraduate, research

Price
£29.99

Summary Review

range: * poor to ***** good

Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

Maths and computing skills are increasingly more important in the fields of chemistry and biology, and **Applying Maths in the Chemical and Biomolecular Sciences** has set itself out to fill a gap in the market for teaching maths and mathematical software to these students. It is a text decidedly aimed at higher year undergraduate students or postgraduates, and would be particularly good for use on a less formally taught course or for a student undertaking directed or independent self study. It is written to go hand in hand with the software *Maple*, without which the book rather loses its point.

Examples of *Maple* code are included throughout the text, which is clearly distinguishable because of the choice of font. There are groups of self study questions at various points throughout the chapters. These questions I have found to be informative, relevant and add to the learning experience, as using *Maple* is something which is best mastered by practice.

The book starts right from the first principles, refreshing mathematical definitions and relationships whilst showing how to lay the equations out in *Maple*. Topics of discussion include bond torsion angles, unit cells and kinetics, all things that might be expected in a chemistry text, but students are lead to them from a mathematical stand point. Therefore chemical kinetics and particle in a box, both come out of the same chapter on differentiation, forming links through maths that might have been missed with these different subjects.

Although to a student it may appear that new concepts, ideas and knowledge are required very quickly the text leads them through with clear prose, plenty of relevant figures and examples. Although mathematical ideas are introduced, this textbook is not for learning how to solve mathematical problems by hand, instead it draws heavily on the assistance of *Maple* to solve these problems for you. There are many worked examples which include lots of *Maple* code worked into the text and these were particularly informative when working through the study questions.

The study questions are usually of a chemical or biological relevance, and show a variation of all that is possible with the skills taught in previous sections. The answers are available online <www.oxfordtextbooks.co.uk/orc/beddard/> and are particularly nice as they are annotated with logical explanations enabling students to clearly follow the reasoning, however, I feel it is always better to included work answers as part of the textbook.

There is a nice appendix including some of the common code for *Maple* as a quick reference guide and ‘crib’, which I found I referred to frequently when working through the examples.

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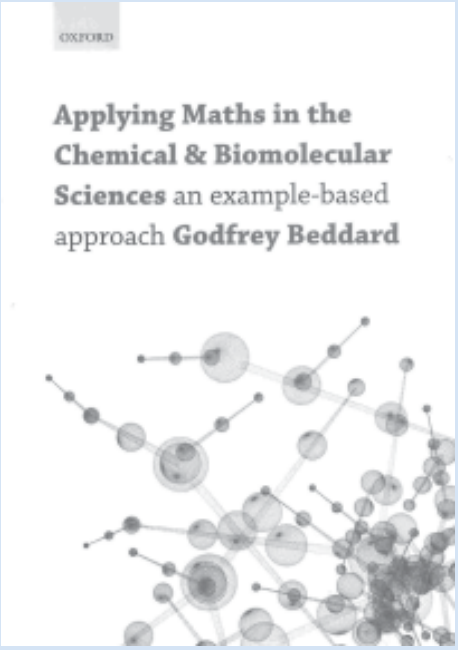
October 2009

Continued on page 6

Applying Maths in the Chemical and Biomolecular Sciences: an example based approach



From the publisher...

Applying Maths in the Chemical and Biomolecular Sciences
An example-based approach
By Godfrey Beddard

The use of mathematics is one of the most powerful tools available to a chemist. Applying Maths in the Chemical and Biomolecular Sciences shows why, using an extensive array of examples to demonstrate how mathematics can be applied to probe and understand chemical and biological systems.
The use of maths as [a] tool in contemporary research has been enhanced through the use of computer software. Applying Maths mirrors current practice by embedding the use of software into the text, showing clearly to the student how the use of maths and the use of software now go hand-in-hand.

978-0-19-923091-4 816pp 2009 £29.99

Continued from page 5

The chapter titles have a mathematical bent, and it is hard at first glance to see the relevance to either the field of biology or chemistry, and if I have a complaint is that the book is not slightly more inviting for the student, although flicking through the index students will see a list of concepts and ideas they are familiar with. Flicking through the book the occasional structure of a molecule or orbital is all that will look familiar.

Although this book is very informative, it is perhaps not as inviting to undergraduates as might be wished. It is however, very well written and the perfect resource for self study. As the title promises there are plenty of relevant and increasing complex examples and questions and opens up an area of chemistry and biology using computational tools which has perhaps been under addressed in undergraduate teaching.

Arrow Pushing in Organic Chemistry: an easy approach to understanding reaction mechanisms

Subject area
Organic Chemistry

Description
This book provides an undergraduate introduction to organic chemistry, with an emphasis on the understanding of the mechanism of organic reactions

Authors
Daniel E Levy

Publishers/Suppliers
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2008

ISBN
978-0-470-17110-3

Level
Undergraduate

Price
£28.50

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Summary Review

range: * poor to ***** good	
Academic content	****
Usefulness to student	*****
Usefulness to teacher	****
Meets objectives	****
Accuracy	****

Arrow Pushing in Organic Chemistry: an easy approach to understanding reaction mechanisms aims to provide a simple introduction to the field of organic chemistry. This text is aimed at first year undergraduate students taking degrees in general chemistry and related subject areas (biochemistry, medicine etc) in which an understanding of organic chemistry is vital. The book covers the basics fields of most undergraduate organic chemistry courses, with chapters covering introductory topics (Acids, Bases and Nucleophiles) and reaction classes (S_N2, S_N1, Elimination and Addition), as well as appendices covering common pK_a values and answers to chapter problems.

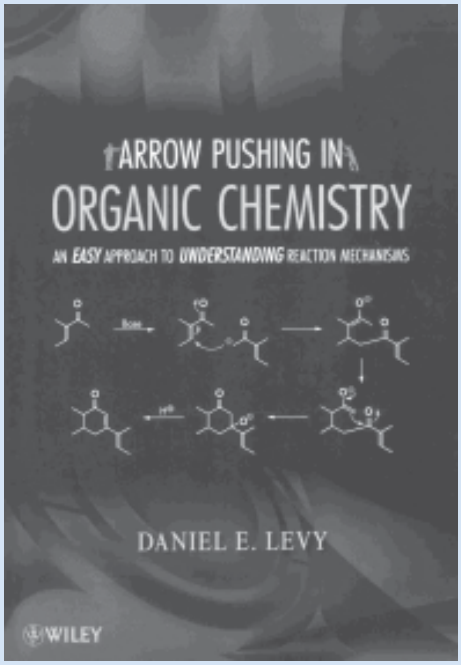
The book is written in an easy going style to assist the student in coming to grips with the basics of the subject. Most of the time, this means that much of the sometimes intimidating technical language of older books is avoided, however this does lead to some deficiencies in the text. In particular, in minimising the technical language content, some key concepts have been poorly defined, leading to either only superficial or very occasionally potentially misleading explanations. For example, resonance forms are discussed on the same page as an introduction to equilibria (with very similar systems), without the clarification that resonance and equilibria are very different concepts. Other areas of the text demonstrate a sporadic introduction of concepts (some high level and detail introductions and some missed entirely). Examples include the use of 'dot' diagrams being used as a transition to 'line' bonding diagrams and a lists of functional groups are given, whilst at the same time there is no explanation of common alkyl abbreviations (eg Me, Et, Pr etc) and no transition from 'all atoms shown' diagrams to assumed valency line diagrams is provided, despite the frequent use of these concepts in the text.

This is further exemplified in the discussion of acids and bases, where several pages are dedicated to a mathematical explanation of equilibrium processes via solutions of the Henderson-Hesselbach equation, whilst relatively little space is given over to the, often poorly understood yet important, differences between pK_a and pK_{aH} or pK_b.

Once the more introductory chapters are complete, a number of very good chapters cover the areas of specific reaction mechanisms (including S_N1, S_N2 and reactions at carbonyl centres). The discussion of each class of reaction is both readable and informative and normally includes comparison of relative rates of similar reactions to demonstrate concepts such as nucleophilicity or steric hindrance. The major strength of the book involved the inclusion of problems at the end of each chapter. These are coupled with a set of very well discussed answers provided in the appendix. The problems fit well with the topic under discussion at each stage and the mechanistic answers and associated explanations are of a high quality, although with occasional step compression (rather than showing the full sequence of events) and with frequent (and increasingly ubiquitous in modern books) lack of proton carriers in protonation/deprotonation steps.

Continued on page 8

Arrow Pushing in Organic Chemistry: an easy approach to understanding reaction mechanisms



From the publisher...

Arrow-Pushing in Organic Chemistry: An Easy Approach to Understanding Reaction Mechanisms

By Daniel E. Levy

Find an easier way to learn organic chemistry with Arrow-Pushing in Organic Chemistry: An Easy Approach to Understanding Reaction Mechanisms, a book that uses the arrow-pushing strategy to reduce this notoriously challenging topic to the study of interactions between organic acids and bases. Understand the fundamental reaction mechanisms relevant to organic chemistry, beginning with Sn2 reactions and progressing to Sn1 reactions and other reaction types. The problem sets in this book, an excellent supplemental text, emphasize the important aspects of each chapter and will reinforce the key ideas without requiring memorization.

978-0-470-17110-3 320pp 2008 £28.50

Continued from page 7

The sometimes partial or variable level of explanation of concepts seems to derive from the authors attempts to produce an introductory text for general organic chemistry, a guide to the use and understanding of mechanism and a work book, and in attempting to fulfil all three of these objectives (rather than one or two) it unfortunately does not live up to its full potential.

In conclusion, this is not a stand-alone undergraduate first year book, but does serve as a good support text for a more comprehensive organic text book. The high point of the book is the provision of a large number of carefully targeted problems at the end of each chapter, complete with well explained worked answers. I am sure that these will be highly useful to students who wish to practice the use of the 'curry arrow' mechanisms. However as a student support book covering concepts of arrow pushing alone, it suffers from a relatively high recommended retail price (£28.50) in comparison to a number of other very well explained 'arrow pushing' books (eg *Reaction Mechanisms at a Glance: A Stepwise Approach to Problem-solving in Organic Chemistry* M G Moloney, Wiley-Blackwell, 1999, £19.50). Thus this text will make a useful addition to a university library or the supplementary reading list of a first year organic chemistry course. It may also be useful for lecturers looking for inspiration for new undergraduate tutorial problems.

Astrophysical Techniques

Subject area
Astrophysics

Description
Emphasising the underlying unity of all astronomical observations, this text provides a coherent state-of-the-art account of the instruments and techniques used in current astronomy and astrophysics

Authors
C R Kitchin

Publishers/Suppliers
CRC Press <www.crcpress.com>

Date/Edition
2008/5th edition

ISBN
978-1-4200-8243-2

Level
Undergraduate, research

Price
£27.19

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

This title is an engaging read for both formal and informal students interested in strengthening their perspectives in astronomical sciences. In formal studies, the book is highly recommended for an undergraduate degree level reading list of both natural and hard sciences. However, sufficiently sound ground knowledge of mathematics and physics and a working knowledge of astronomy are essentially the prerequisites for the efficient utilisation of this resource, especially when translated into academic added-value.

Detectors, imaging, photometry and spectroscopy are successively supplemented by some other techniques in the last part, Chapter 5, of the book. 'Detectors' of almost all electromagnetic waves, starting from the human eye to Hubble's space telescope, are discussed in detail. Some of the details could have been avoided without compromising the coherence and/or the objective function. Indeed, the important detectors include visible light instrument-UV, infra red (IR), radio waves, microwaves, X-rays, and Gamma rays regions, all having being addressed in Chapter 1 of the book.

The theory of detectors is cohesively explained in an easy to understand manner, while schematic diagrams and tables, showing the classification scheme for detectors and detector parameters, offer analytical formulations useful for both teachers and researchers. Full instrumental detail has also been provided with elaborate discussion of some other detectors widely used to detect cosmic rays, neutrinos and gravitational radiation.

The discussion on telescopes provides a wide range covering almost all sizes, types and uses of the instrument. Simple mathematical formulations and various illustrations help enhance understanding and are highly useful for both the expert and the beginner. As a matter of fact, the relevance for both the expert and the beginner appears to be the most overwhelming characteristic feature of this book and, perhaps, it is also responsible for the extensive elaborations and repetitions within and across the chapters respectively. Indeed, a closer look into the genre of successive topics renders repetition desirable, if not warranted, hence the strength rather than weakness of the book.

The part of the book devoted to Imaging, Chapter 2, starts with a discussion on photography. The introduction of the topic is convincingly simple and arrests the attention of even the layperson. The student on the subject is, however, entertained with sound theoretical perspectives and easy to grasp mathematical formulations, followed by processing in the visible range. Photographic applications in space again invite the interest of the informal learner, while the student on the subject is systematically aided by dividing the photographic techniques and instrumentation according to the radiation coming from the outer space. However, the discussion on interferometry in all electromagnetic wave regions is pretty demanding and, though supported with useful illustrations and figures, requires both relevant perspectives and effort on the part of learner. Similarly, topics such as electronic imaging, scanning, speckle interferometry, occulations, and radar techniques have been covered.

Continued on page 10

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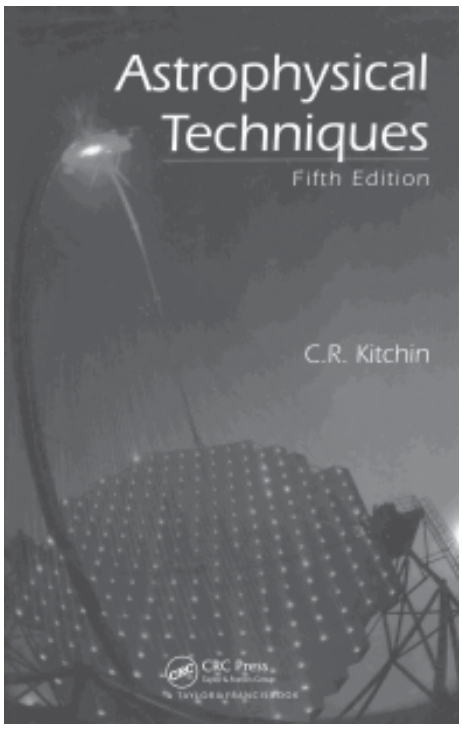
Astrophysical Techniques

Continued from page 9

Some apparent gaps in interpretation of certain aspects are due to the complexity of the respective topic and are indeed suggestive to the reader for having recourse to supplementary material in relevant sciences to help build up the required perspectives.

Instrumentation for photographic photometry, CCD and photoelectric photometers are all described in detail in Chapter 3. Experimental details are both useful and interesting. Plotting of complex details helps comprehension of both mechanical and operative functions of advance instruments. Instrumental photometry is, of course, facilitated by building up the reader's perspectives on concepts such as filter systems and Steller's parameters. It is the discussion on photometers which is followed by the introduction and detailed description of respective instrumentation.



Although the text continues to retain considerable scholarly, academic and technical value for its entire length, the discussion on spectroscopy, Chapter 4, ought to be 'crowned' for its worth in terms of instrumental details. Even the most sophisticated and advanced instruments are made to appear user friendly with the help of highly useful diagrams and easy to follow mathematical derivations. The reader having relevant theoretical perspectives and some basic instrumental knowledge comfortably works through the instrumental details of interferometers (Fabry-Perot interferometers & Michelson interferometers), fibre optics, spectroscopes, prism-based spectroscopes, and grating spectroscopes. Diffraction gratings are covered in the introduction of the Chapter. The author has addressed almost all major conceptual and instrumental aspects relating to the vast universe of spectroscopy. The articles on prisms, integral field spectroscopy and multi objects spectroscopy are written in a simplified form and schematic diagrams help explain the minutest internal details of the instruments.

Chapter 5, though short of a concept specific title, is initially a treat for all - layperson, student and the expert. The author's ability appears to range from the simplest to the most analytic. Models showing celestial spheres including the earth and stars invite both wonder and curiosity. However, the subsequent heavy dose on instrumentation is essentially meant for those already in the business of investigation and/or preparing to enter the vast domain of scientific research. The instrumental detail includes transit telescopes, photographic zenith tube, impersonal astrolabe, micrometers, astrographs, space-based systems, polarimetry, optical components, birefrigence polarisers, converters and a few more: polarimeters such as photographic polarimeters, photoelectric polarimeters, CCD and other detectors. There is also a discussion on spectrometry, followed by data reduction analysis and a flow chart of polarimetric analysis.

Solar telescopes are comprehensively covered in the part on solar studies along with other advanced instrumentation including spectrohelioscope, narrow band filters, Pyrheliometer, followed by a simplified description of magnetometry (Zeeman effects and normal Zeeman effects). The reader's comprehension is markedly enhanced with sketches, illustrations and elaborations. Nonetheless, a real life exposure to these instruments remains a must to fully benefit from the highly appreciable effort made by the author while introducing, explaining and elaborating intricate conceptual and mechanical complexities. The Chapter ends with the brief introduction and description of digital sky surveys accessible on the internet.

The book encompasses the instrumental details widely considered to be a necessary part of the required stock of knowledge of both teachers and researchers in the relevant scientific domains. Instrumental details are variously augmented by structural diagrams and elaborate geometrical depictions. Finally, at the outset, the author appears to educate the reader on a state of the art account of modern instrumentation for studying astronomy and astrophysical sciences. Such a limited objective nonetheless did not need a voluminous text of more than 500 pages. Therefore, the real worth of this book is to be appreciated in easy to understand details of instruments, both in their mechanical construct and application.

Atomic and Laser Spectroscopy

Subject area
Physics, Physical Chemistry

Description
This book discusses many advances in optical physics, and is aimed at advanced undergraduates taking courses in atomic physics, or graduate students in the fields of lasers, astrophysics, and physical chemistry

Authors
Alan Corney

Publishers/Suppliers
Oxford University Press
<ukcatalogue.oup.com/category/academic.do>

Date/Edition
2006

ISBN
978-0-19-921145-6

Level
Undergraduate, research

Price
£46.00

Zia Khan
CA/151,9/A
Muhammad Hussain Road
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Bahawalpur
Pakistan
November 2009

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

Methodical, systematic and consistent. These are the words which perhaps best describe this title, a recommended reading, specifically for students and instructors interested in going beyond the introductory knowledge of electromagnetism, atomic physics and quantum mechanics. The academic worth of this book is already well established, since its genesis is to be found in a set of lectures on Atomic Physics delivered by the author to 3rd year undergraduates at the University of Oxford. However, the book certainly offers substantial added-value even to the novice.

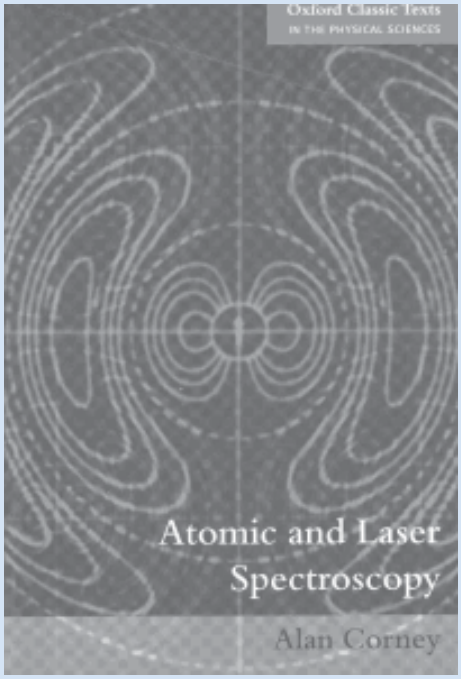
An expert glance at the contents is enough to extend the title a high rating of accreditation, specifically in terms of author's ability to help the reader work through highly complex topics within an interlinked and yet gradual pattern spanning over a total of eighteen chapters. Nothing appears to be taken for granted, as the first five chapters are essentially there to help enhance the understanding of interaction of electromagnetic radiation with free atoms and hence the fundamentals of atomic physics, electromagnetism and quantum mechanics. The concepts move on to processes in the following three chapters which are devoted to the spontaneous emission of radiation. The progression continues to the extent of devoting the largest chunk of the book, Chapter nine to fourteen, to the learning of stimulated transitions and properties of gases and tuneable dye lasers. After having worked through the essential perspective, the reader is then helped into experimentation involving the application of resonance-fluorescence, optical double resonance, optical pumping and atomic beam magnetic resonance. All in all the book is a treat for those voting in favour of intensive comprehensiveness, a trait which is certainly a rarity in advanced scientific literature.

The topics covered in the first five chapters involve a wide range of phenomena explaining the working of nature witnessed by scientific discoveries. The introductory level information is carefully synchronised to vividly reflect on advanced scientific concepts like classical electrodynamics, quantum mechanics, the spontaneous emission of radiation and the selection rules for electric dipole transitions. No important aspect of a topic is left unattended and the progression of the text ensures the absence of gaps and voids which may later become responsible for unintended inefficiencies caused by lack of relevant theoretical perspectives and analytical skills. Thus topics like Planck's Radiation Law, photoelectric effects, Maxwell's equations, electromagnetic wave equations, linear and circular polarisation and energy density, are allocated commensurately sufficient space in the text with skilfully managed explanations. Where relevant and helpful, the author has made use of mathematical formulations and diagrams. Indeed, simple analytical formulations explain concisely and with precision the otherwise quite difficult topics like angular momentum of dipole radiation, magnetic dipole radiation and electric quadrupole radiation.

While considering quantum mechanics, the Schrödinger's wave equation receives comprehensive coverage including its solution for spherically symmetric potentials, orbital angular momentum, spin angular momentum, spin orbit interaction, the vector model and many electron atoms. By the end of Chapter 5, a methodical student is expected to have systematically

Continued on page 12

Atomic and Laser Spectroscopy



From the publisher...

Atomic and Laser Spectroscopy

By Alan Corney

This book discusses many advances in optical physics, and is aimed at advanced undergraduates taking courses in atomic physics, or graduate students in the fields of lasers, astrophysics, and physical chemistry. The book is intended mainly for experimentalists, and the interaction of electromagnetic radiation with free atoms is introduced using classical or semi-classical calculations wherever possible. Topics discussed include the spontaneous emission of radiation, stimulated transitions and the properties of gas and turnable dye lasers, and the physics and applications of resonance fluorescence, optical double resonance, optical pumping, and atomic beam magnetic resonance experiments.

978-0-19-921145-6 784pp 2006 £46.00

Continued from page 11

incorporated the fundamentals considered to be prerequisites for efficient understanding of subsequent advanced level phenomena. Specifically, the discussion on 'Spontaneous Emission Radiation' has been undertaken in a manner which fully absorbs the student's attention and helps them comprehend and retain the essentials without making a deliberate effort for devising a selection rule (it is also the name of a chapter providing an easy to follow explanation of one electron atom without spin, atoms with spin, tensor properties of the electric dipole operator and relative intensities in L-S coupling and forbidden transitions). The classical atomic model, inadequacy of simple quantum theory and a few highly useful comments on spontaneous quantum theory of emission, all facilitate intensive understanding of the topic with the benefit of sound and relevant perspectives. The discussion is further augmented by highly informed reflections on spontaneous transitions between degenerate levels, intensity of light emitted by optically thin sources and theoretical oscillators strengths in complex atoms.

In all fairness, the author deserves to be applauded even before learning the worth of the effort in the remaining much bigger chunk of the book. The real proof, however, essentially lies in the pudding and for that a close read of Chapter six, seven and eight of the book is a must to appreciate the author's contribution to authentic scientific literature. Highly complex phenomena involving measurement of the radioactive lifetime of atoms and molecules (beam foil method, fast beam experiments using laser excitations, the delay coincidence method using electron excitation and optical excitation), forbidden transition and meta-stable atoms (magnetic dipole transitions, electric quadrupole radiation, two photon decay of hydrogenic systems, forbidden transition in helium like systems and collision processes involving meta-stable atoms) smoothly flow into retainable understanding with the help of analytical tools including diagrams and easy to follow mathematical formulations. Discussion on the width and shape of spectral lines visibly progresses in a systematic fashion successively involving the depiction and elaboration of natural radioactive line shape, the classical line shape, the quantum mechanical line shape, the pressure broadening of spectral lines, Doppler's broadening and profile measurements at low pressure and temperature. Absorption and stimulated emission of radiation is a topic demanding highly inspired discussion to help students appreciate the scientific significance of the phenomenon, in terms of both its conceptual and operational definitions.

There is hardly any aspect which has been skipped and/or overlooked by the author. A diligent student ought to consider Chapter 9-14 a challenge loaded with the promise of high dividends for all future pursuits on the subject. Anatomically speaking, these chapters

Atomic and Laser Spectroscopy

appear to this reader as if containing the vital organs of the body text. The highly enlightened and yet simplified approach of the author to complex scientific phenomena reflects systematically on the classical description, Einstein's treatment, the semi-classical treatment of absorption and induced emission. This is followed by Einstein's B-coefficients and its relation with F-values, the integral of the total absorption cross-section and the atomic frequency response. The level of difficulty certainly increases as the discussion moves on to radioactive transfer. The challenge subsequently increases with every successive unit, though essentially supported by mathematical formulations and vivid diagrams. For example, the formation of spectral lines supported by the equation of the transfers, the solution of the transfer equation for uniformly excited sources, non-uniform sources, equivalent width of absorption lines, measurement of relative F-values and determination of chemical composition and atomic densities. Population inversion and atomic beam coefficients are two other very important articles providing rich analysis and discussion, equally rewarding for both students and teachers.

The last four chapters essentially represent the summit of a steep uphill struggle, though constantly provided with the assurance of life saving support as long as the mountaineer possesses the requisite skills for use of the equipment including mathematical formulations and diagrams. The major articles range from Hanle's effects to the theory of resonance radiation. The learning on experimentation includes a wide range and essentially requires both instrumentation and technical know-how for effective outcomes. The student is guided through the resonance-fluorescence experiments, optical double resonance experiments, optical pumping experiments and the hyperfine structure of atoms and its investigation by magnetic resonance methods. The emphasis also includes principles of optical pumping, relaxation processes, spin exchange collision, optical pumping of meta-stable atoms, magnetic resonance and quantum theory of optical pumping cycle.

The tail end, last chapter, begins with the hyperfine structures of atoms and goes a long way before finally presenting the investigation of hyperfine structure of the excited states.

The book is a handy reference for all, formal students, teachers, academic and/or professional researchers in chemical physics and physical chemistry. Theoretical perspectives, experimental details, mathematical formulations and schematic depictions, including structural and instrumental diagrams, are all synchronised in this title to the best advantage of an informed and inquisitive learner and user. However, some focus on relevant computational methods in the revised edition will not only interlink the contemporary age of IT in the overall synchronisation scheme, it most certainly will also be rewarded with substantial added-value for all practical purposes.

Basic Gas Chromatography

Subject area
Analytical Chemistry

Description
This book provides comprehensive coverage of basic topics in the field, such as stationary phases, packed columns and inlets, capillary columns and inlets, detectors, and qualitative and quantitative analysis

Authors
Harold M McNair and James M Miller

Publishers/Suppliers
Wiley-VCH (John Wiley and Sons) <eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2009/2nd edition

ISBN
978-0-470-43954-8

Level
Undergraduate

Price
£43.50

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November 2009

Summary Review

range: * poor to ***** good

Academic content	*****
Usefulness to student	*****
Usefulness to teacher	****
Meets objectives	*****
Accuracy	*****

The preface to this second edition states that the intentions of the authors have remained the same –"'to keep the book small, basic and fundamental". There are some new chapters in this edition which cover fast GC, multidimensional GC and the GC analysis of non-volatile compounds. These later chapters deal with topics which many students will not encounter during their undergraduate degree but they are important aspects of gas chromatography and therefore merit inclusion in a text such as this one.

Chapter 1 introduces us to the terms used in gas chromatography and provides a handy table which shows how the terms currently accepted by IUPAC map onto terms which may still be found in older texts. This is important to students as they can become confused when reading around a topic if the terminology has changed over time.

Chapter 3 explains the origins of chromatographic terms such as the distribution constant, retention factor etc and explains clearly how peak shapes are defined and peak parameters are measured by an instrument. Again this benefits undergraduate students as well as those who need a refresher course in the vocabulary of chromatography. Equations are provided to illustrate the explanations and it is all written in clear language which is easy to follow.

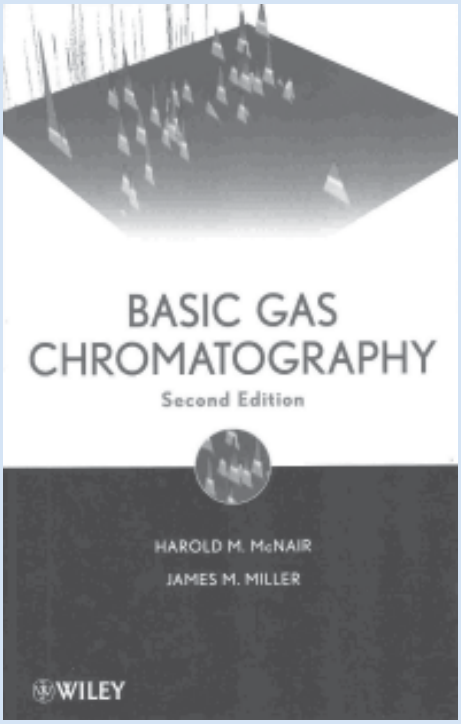
Chapters 4 to 6 deal with stationary phases and column types and introduce students to terms such as separation factor and Kovat's retention index. Illustrations of the cross sections of capillary and packed columns are included along with diagrams and explanations of injection systems for GC. The text explains why split/splitless injection is required for GC systems with capillary columns and why 6-port valves can be used for packed columns. The benefits and limitations of both column types are clearly explained but not in excessive detail. The authors aim to keep the text brief is achieved whilst still providing sufficient information to students and other users of GC.

The three main types of GC detector are dealt with in turn, FID, TCD and ECD with diagrams showing how they operate and the types of compounds they are each capable of detecting. At the end of the chapter there is a very brief comment about other detectors but this is not really provided in enough depth to be useful.

Chapter 10 ambitiously describes GC-MS in less than 15 pages but does so effectively given the aim of this book. It is concise but should meet the expectations of the readers of this book and is well illustrated.

Chapters 11 and 12 are new to this edition and introduce multidimensional GC and sampling methods such as liquid-liquid, headspace and solid-phase extraction as well as solid-phase microextraction. These chapters are very well illustrated and set these techniques in context.

Basic Gas Chromatography



From the publisher...

Basic Gas Chromatography, 2nd Edition

By Harold M. McNair, James M. Miller

Since the publication of the highly successful first edition of Basic Gas Chromatography, the practice of chromatography has undergone several notable developments. Basic Gas Chromatography, Second Edition covers the latest in the field, giving readers the most up-to-date guide available, while maintaining the first edition's practical, applied approach to the subject and its accessibility to a wide range of readers.

978-0-470-43954-8 239pp 2009 £43.50

Finally chapter 14 is devoted to troubleshooting. This is an excellent chapter and set at the perfect level for undergraduate students and those starting out in GC analysis but would also act as a great refresher for those more experienced. Diagrams illustrate the possible problems seen in GC traces or 'symptoms' and the text explains the possible causes and how they can be remedied.

Overall I think this is a well structured book and meets the aims of the authors very well. Yes, the book is concise and more detail will be required by students pursuing this topic beyond undergraduate lectures but it provides a perfect introduction to the topic in short, easy to digest chapters.

If you are looking for a very detailed and comprehensive GC text to recommend to students or read yourself then this is probably not the book for you but if you are looking for a solid introduction to the topic and something that will get you thinking about GC and how to use it, then this is just what you are looking for.

Chirality in Transition Metal Chemistry: molecules, supramolecular assemblies and materials

Subject area
Inorganic Chemistry

Description
An advanced textbook which demonstrates how transition metal chemistry has an important role in coordination, organometallic and supramolecular systems. Applications to organic synthesis, materials science and molecular recognition are also discussed

Authors
Hani Amouri and Michel Gruselle

Publishers/Suppliers
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2008/1st edition

ISBN
978-0470-06054-4

Level
Undergraduate, research

Price
£37.50 (paperback) £95.00 (hardback)

Ryan Mewis
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November 2009

Chirality in Transition Metal Chemistry: molecules, supramolecular assemblies and materials by Amouri and Gruselle has been designed to cover new discoveries in the field since 1996. It is part of Wiley's advanced textbook range, which covers a range of pivotal modern inorganic and physical chemistry topics. The book comprises six chapters, which begins with a brief introduction to the field before dealing with the subject of 'Chirality and Enantiomers'. The remaining four chapters focus on topics ranging from 'Chiral Recognition in Organometallic and Coordination Compounds' to 'Chiral Enantiopure Molecular Materials'. The chapters have been written in such a way to encapsulate their respective areas by highlighting the most relevant discoveries and papers. This approach means that for the majority of chapters, information is presented in a review like style. Some students may find this a difficult style to read, given the way in which other text books are presented. However, this comprehensive approach means that each area can be tackled effectively and purposefully, and as such, does not do any injustice to the topic under discussion. The inclusion of references at the end of each chapter of the text means that particular papers can be retrieved and read in their entirety. This aspect of the text would be readily welcomed by the interested undergraduate and postgraduate student alike.

Summary Review

range: * poor to ***** good

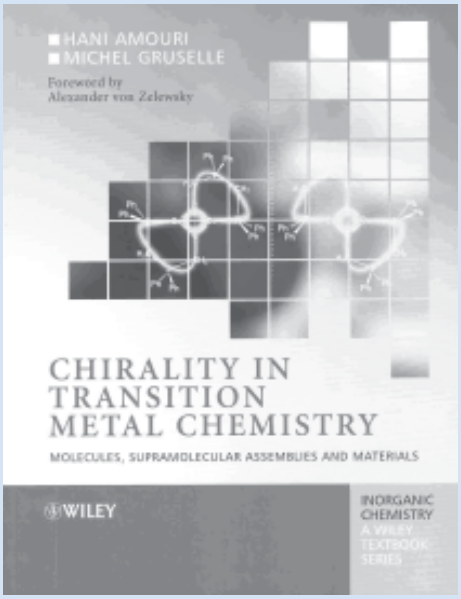
Academic content	*****
Usefulness to student	****
Usefulness to teacher	****
Meets objectives	****
Accuracy	*****

The Chapter on 'Chirality and Enantiomers' is comprehensive in its treatment of the subject. This is reinforced with diagrams that would aid a student's ability to understand the subject. Diagrams not only use chemical structures to explain the concepts being discussed, but also a mixture of more familiar chiral objects (such as hands and feet) in order to explain aspects associated with chirality. These diagrams are used to reinforce concepts so that a greater understanding of the subject is promoted within the reader. This understanding, however, may have been better assisted by the inclusion of self-tests and the like. As a textbook designed for students, the reviewer felt that this would prove to be beneficial to the student reader. This necessarily might not have to be included in the book, but instead could be an online resource which could be readily accessed alongside the main text. Also included within the chapter 'Chirality and Enantiomers' are the methods used for determining enantiomeric excesses and for the resolution and preparation of enantiomers.

Chapter 3 delivers an overview of chirality in modern organometallic chemistry. This covers the resolution of the first organometallic compound right through to modern day examples of how organometallic complexes are used in organic complexes. The latter is discussed further by highlighting particular examples of asymmetric complexes which are important in academic and industrial applications. This chapter builds on the previous one by putting organometallic chemistry into a real-world perspective. This is an important for the student reader as they can really gain not only an appreciation of the chemistry but also for the different areas it may be applied to.

Chapter 4 deals with 'Chiral Recognition in Organometallic and Coordination Compounds'. This is an important field due to its biological relevance in the areas of drug discovery and also for the understanding of biological processes. As such, this chapter really exemplifies the importance and applicability of chirality in transition metal chemistry and

Chirality in Transition Metal Chemistry: molecules, supramolecular assemblies and materials



From the publisher...

Chirality in Transition Metal Chemistry: Molecules, Supramolecular Assemblies and Materials

By Hani Amouri, Michel Gruselle

Chirality in Transition Metal Chemistry is an essential introduction to this increasingly important field for students and researchers in inorganic chemistry. Emphasising applications and real-world examples, the book begins with an overview of chirality, with a discussion of absolute configurations and system descriptors, physical properties of enantiomers, and principles of resolution and preparation of enantiomers. The subsequent chapters deal with the specifics of chirality as it applies to transition metals.

978-0-470-06054-4 260pp 2008 £37.50

the fields associated with it. The chapter begins with a discussion on the sedative thalidomide, and the associated fetal toxicity of one of its enantiomers. This is followed by highlighting the way in which our taste receptors use chiral recognition, thus enabling us to differentiate between enantiomers resulting in distinct tastes. Several sections detailing chiral recognition between chiral complexes and optically active substrates or receptors are then presented, which includes a section on molecular light switches for DNA.

Chapter 5 covers 'Chirality in Supramolecular Coordination Compounds'. It details the different methods to prepare chiral supramolecular assemblies. The chapter first introduces the synthesis of transition metal supramolecular architectures from achiral bridging ligands before moving on to discussing chiral non-racemic supramolecular assemblies. This chapter encompasses many different examples from the available literature which are supported by a great number of figures and diagrams.

The final chapter is concerned with 'Chiral Enantiopure Molecular Materials'. This is the longest chapter of the textbook, mainly because of the high number of figures used in support of the text, which exemplify how molecular architectures can form extended structures. The chapter provides the reader with many examples of how chirality in molecular materials can influence the solid state organisation of materials and their associated physical properties.

To summarise, this text would be suitable to both the undergraduate and research student alike who have an interest in chirality in transition metal chemistry, or those fields closely associated with it. One minor drawback with the text is that as an advanced textbook, the lack of self-test exercises may prevent this text from being accessible to all students, especially those who find the subject difficult to grasp. However, the way in which the subject has been tackled and presented to the reader means that it would be ideal as a support text. For the research student who is actively engaged within this field, this textbook would prove to be an excellent starting place for perusing the literature within a particular facet of their research, or to gain a general feel for their research area.

Collider

Subject area
Particle Physics

Description
A book about modern particle colliders

Authors
Paul Halpern

Publishers/Suppliers
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2009

ISBN
978-0-470-28620-3

Level
General

Price
£18.99

Summary Review

range: * poor to ***** good	
Academic content	****
Usefulness to student	****
Usefulness to teacher	***
Meets objectives	*****
Accuracy	****

Collider is a very up-to-date book by an American academic describing the development of modern colliders like the Tevatron in the US and the Large Hadron Collider (LHC) in Geneva.

Beginning with a compact discussion of the current model of particle physics, the book describes the rise and eventual fall of the Superconducting Super Collider (SSC), the evolution Fermilab and the Tevatron under Wilson and the development of the LHC.

The book is very up to date (published 2009), covering the aborted startup of the LHC in 2008 and giving a reasonable description of the state of play of the International Linear Collider in a well-written conclusion.

This book is written in an extremely engaging and lively style, and the author carries the reader along on the journey through the book's material with ease and clarity. The chapter on the early days of accelerator based experiments at Cambridge is a particular pleasure to read. This period, with figures like Thomson, Marsden, Geiger and Adams working under a regal Rutherford was the time when the famous scattering experiments of Alpha particles from a gold foil revealed the structure of the atom and paved the way for the modern view of matter and ultimately the standard model of particle physics we have today. The accelerator developments which allowed these discoveries set in motion a wave of bigger and bigger atom smashing machines and led to the likes of Adams being crowned the father of modern particle accelerator physics.

The prose captures very well the pioneering spirit of this time and is particularly inspiring for young particle physicists today to see how far ingenuity and hard work can take you. Also a pleasure to read is the discussion of the SSC in the US, and its ultimate fate. The fall of this super machine still reverberates today around the accelerator labs of the US, and the author briefly chronicles the origin of the machine and the decisions made which ultimately led to the cancelling of the project when many miles of tunnel had already been built and scores of physicists and engineers relocated to Texas. The author captures well the dismay of the time, and would be a nice history lesson to some of the current generation of scientists who have only ever known other, more successful, machines.

Less satisfying are the chapters on the standard model of particle physics and the fundamental physics hoped to be uncovered when the LHC turns on. The author clearly thought long and hard how to communicate the complexities of these ideas to a lay-audience, with a partially successful result and a scattering of over-stretched analogies. These chapters are interwoven with the chapters on the development of the machines themselves, giving a nice narrative but ultimately the reader is left wanting a little more from both kinds of chapter.

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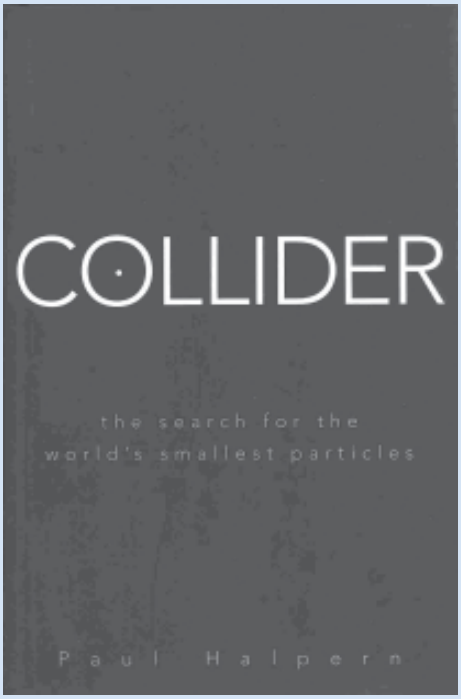
October 2009

Collider



From the publisher...

Collider: The Search for the World's Smallest Particles

By Paul Halpern

Contents: 1 The Secrets of Creation. 2 The Quest for a Theory of Everything. 3 Striking Gold: Rutherford's Scattering Experiments. 4 Smashing Successes: The First Accelerators. 5 A Compelling Quartet: The Four Fundamental Forces. 6 A Tale of Two Rings: The Tevatron and the Super Proton Synchrotron. 7 Deep in the Heart of Texas: The Rise and Fall of the Superconducting Super Collider. 8 Crashing by Design: Building the Large Hadron Collider.
9 Denizens of the Dark: Resolving the Mysteries of Dark Matter and Dark Energy. 10 The Brane Drain: Looking for Portals to Higher Dimensions.
11 Microscopic Black Holes: A Boon to Science or a Boom for the World?

978-0-470-28620-3 272pp 2009 £18.99

A further, mild, gripe is the dominant American perspective, which gives rise to the well-researched discussions of the SSC and the Tevatron, but means that the role played in important machines like LEP (the collider in Geneva before the LHC) and HERA in Hamburg is essentially neglected and the key physics results they produced ignored. This gives a one-sided view of the development of the subject but this one-sided view is not hidden by the author and actually leads to some fascinating insights into how American scientists view our modern colliders like the LHC.

Overall, this readable book is useful as an overview of some of the history of the large colliders and gives a nice description of how we arrived where we are now. The writing style will have broad appeal and rarely dips into a dull narrative of events. Indeed, the discussion of the formation of mini black holes at the LHC is worth the cover price alone. However, the reader should remember the American bias of the book and will probably want to look elsewhere for a fuller account of some of the underlying physics ideas. All in all, a worthwhile and satisfying read.

Comets and the Origin of Life

Subject area
Astronomy

Description
This book sets out the case for cometary panspermia in a cogent way, combining evidence from space science, celestial mechanics, geology and microbiology

Authors
Chandra Wickramasinghe, Janaki Wickramasinghe and William Napier

Publishers/Suppliers
World Scientific
<www.worldscientific.com/index.html>

Date/Edition
2009

ISBN
978-981-256-635-5

Level
Research

Price
£41.00

Summary Review	
range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

The discovery of an increasing number of 'exoplanets' - planets around other stars and the first tentative clues as to the composition of their atmospheres has led to the birth of a new scientific field, that of Astrobiology. It is now increasingly realistic to develop scientific programmes that will look for signatures of life on such exoplanets which, coupled with the detailed study of planets in our solar system, may own day answer perhaps the biggest unresolved question of modern science 'Are we alone in the Universe' or is life a common phenomena? Such a question is intricately linked to discussion of the origins of life. How did life begin on Earth? Was it is a Darwinian 'little warm pond' where the chemical ingredients of life self assembled to form the first 'protocell' that then gave 'birth to life' or was life 'parachuted in' amongst the cometary material that impacted the early Earth. It is the latter 'panspermia' hypothesis that the authors espouse in this book.

That the interstellar medium is capable of rich chemistry and that many of the prebiotic compounds necessary for life can be synthesised as part of the chemistry that surrounds star and planet formation is now well known and meteorites show a rich amino acid chemistry that suggests such material may indeed have been transported to the surface of the Early Earth - but what then? The great unknown remains how such material is assembled, what conditions are needed and if the Early Earth *or cometary interiors* provide the environment that allows this to happen. The authors argue that it is within comets that such a synthesis may occur and that comets then act as the carrier of life throughout a solar system if not between solar systems. This book essentially presents a case for such a hypothesis describing in successive chapters the chemical composition of cosmic dust, the physical and chemical nature of comets and, their potential for panspermia and how microbes embedded in such material may survive expulsion from one solar system to travel to another, an essential being liquid water inside the cometary core. However as they seek to defend their hypothesis they are forced to build layer upon layer each valid in its own right but the combination suggest that the probability of all such conditions occurring simultaneously is increasingly unlikely. Indeed their passion for the cause sometimes stretches the case a little too far for me!

Nonetheless as the authors discuss at the end of the book we don't know how life began or if it is common (even a natural result of the construction of our universe). It remains an intriguing mystery and one that will challenge us for many decades to come. Surely the discovery of life, even it is simplest form, elsewhere either in our solar system through robotic exploration or as a spectral signature of some exoplanet will be pivotal moment in humanity's scientific endeavours. This book challenges us to ponder on our origins and therefore deserves to be read by those embarking on astrobiology studies, if only to seek to refute the hypothesis put forward.

One final note the book unfortunately has several references missing which I hope could be corrected.

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November 2009

Energy science: principles, technologies, and impacts

Subject area
Energy Science

Description
A comprehensive review of the main alternative energy technologies to oil and gas, which discusses the basic science and engineering concepts alongside social, economic and environmental impacts

Authors
John Andrews and Nick Jelley

Publishers/Suppliers
Oxford University Press
<ukcatalogue.oup.com/category/academic.do>

Date/Edition
2007

ISBN
978-0-19-928112-1

Level
Undergraduate

Price
£27.99

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Glasgow G1 1XJ
October 2009

Summary Review

range: * poor to ***** good

Academic content	****
Usefulness to student	****
Usefulness to teacher	****
Meets objectives	****
Accuracy	***

Intended use and area of application
The book addresses the current issues related to energy science, possibly requiring revision as developments are made, and provides detailed information to investigate the competing and complementary methods of energy provision in a format that demonstrates to readers what lines of enquiry and assessment are required for such comparisons. The book also manages to relate many of the issues of, for example, safety, social, environmental and economic factors for each technology and, as the title suggests, considers the relative impacts of each energy type. By using case studies it allows the reader to critique each energy technology with a demonstrable example.

Requirements
A major strength of the book is its format, as it guides the reader through each energy type with a gradual building of knowledge, providing the accessibility to readers mentioned by the authors in the preface. It is possible for students with the described high school science and mathematics to use the text effectively, however, there may be issues with some of the more complex ideas and exercises. There is a chance that for more advanced readers, who tackle the more complex concepts, additional reading and texts may be required possibly in fluid mechanics, heat transfer and thermodynamics.

Style
There are useful summary and symbols used for each topic and a good number of varied additional information links. The general aesthetics of the book make the text easy to follow with reading, and information sourcing, a relatively easy task. Highlighting of keywords is extremely useful, especially for recapping.

Accuracy/Errors
The exercises given have answers for numerical tasks, which are (for those checked) mainly correct, however, there is no additional working and no direction at all for questions that are descriptive or require proofs. Often students make very small errors in questions that a worked solution can assist in detecting and correcting, a final answer is often insufficient and is completely useless for those who cannot see an initial entry point to the question. It is also noteworthy that the worked solutions often do not show units in working, which can cause confusion for students and, in some cases, results in an incorrect solution. Some of the equations given are used outside of the usual context, which makes some forms questionable and, on occasion, units for given quantities are erroneous.

Usefulness of the book
This book would be of use on a few courses taught within our department, for example a renewable energies project undertaken by first year students where the overview and comparative nature of the text would be useful, our sustainability course where the discussed impacts would be of use and our course on emerging technologies, which covers many of the topics included in the book. As mentioned before, the book would be accessible to students from most years, however, we do not require detailed mathematical analysis of these techniques, at present, so some of the more extensive examples would be for reader personal development rather than vital to the course.

Essential Mathematics and Statistics for Science

Subject area
Mathematics, Statistics, Physical Sciences

Description
This book allows science students to extend necessary skills and techniques, with the topics being developed through examples in science which are easily understood by students from a range of disciplines

Authors
Graham Currell and Anthony Dowman

Publishers/Suppliers
Wiley-Blackwell (John Wiley and Sons) <eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2009/2nd edition

ISBN
978-0-470-69448-0

Level
Undergraduate

Price
£27.50

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West Midlands WV1 1LY
October 2009

Essential Mathematics and Statistics for Science 2nd Edition is designed as an introduction to the mathematical principles a science student will need to complete their degrees. It begins with simple every day mathematical functions and ends with statistics and experimental design. The book is accompanied by an expansive array of web-based additional material that follows alongside each topic and includes interactive problems and video tutorials.

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

Alongside the mathematics are instructions in calculator and Excel functions which students will find valuable. The progression from mathematical principles to relevant scientific examples is excellent for those students who prefer the applied method of learning. The authors take principles that students often have difficulty with and break them down into easy to follow chunks with worked examples and finally questions for the students to attempt themselves. The short answers are in the back and longer explanations are available on the accompanying website.

The book includes examples from all areas of science, so this becomes an invaluable reference guide to any science student. A suggestion for a future edition would be the addition of non-scientific methods of memorising techniques, eg for the slope of the line – using the rise/run explanation.

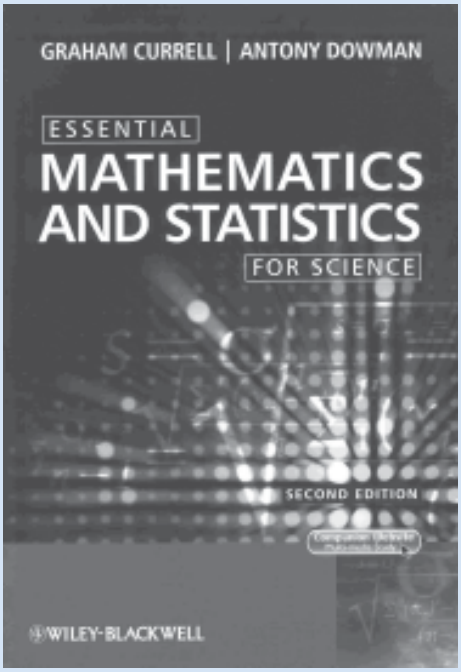
For students planning their final year projects there is an informative section on scientific methodology and project planning which concludes with the use of appropriate statistics in experimental design. Many students find the statistical element of the project daunting and struggle to understand the necessity of its inclusion. Essential Mathematics helps to break down this barrier by making statistics accessible through relevant examples and the extensive reference material.

The statistics includes parametric tests and non-parametric tests with reasoning for the use of both. The omission of explanations of Bayesian statistics from the content of the book is a disappointment for the forensic students but there are web-based explanations available on the companion website. These appear as links which allow you do download extra Acrobat .pdf files of additional chapters. The chapter on Bayes' Theorem does not however have examples that students can attempt.

The companion website contains Excel tutorials that students will find useful and would be effective addition to study skills modules. There is also an introduction to Minitab for more complex statistics that are not possible in Excel, which the students may find easier to use than SPSS.

The book is reasonably priced at £27.50 as the methodologies will follow the student through every year of their degree studies. The pre-requisites for the reader would be GCSE level mathematics.

Essential Mathematics and Statistics for Science



From the publisher...

Essential Mathematics and Statistics for Science, 2nd Edition

By Dr. Graham Currell, Dr. Antony Dowman

This book is a completely revised and updated version of this invaluable text which allows science students to extend necessary skills and techniques, with the topics being developed through examples in science which are easily understood by students from a range of disciplines. The introductory approach eases students into the subject, progressing to cover topics relevant to first and second year study and support data analysis for final year projects.

978-0-470-69448-0 404pp 2009 £27.50

Overall Essential Mathematics and Statistics for Science should be recommended as a valuable addition to the science student's reference library, if not recommended as a core text. It is accessible to those students who need additional assistance with mathematical principles and as a 'refer to' guide to those students who are more mathematically able.

The companion website will appeal to the modern students who rely on the internet for the majority of their learning needs. The video explanations will help those students who lack confidence in their mathematical skills as they can watch repeatedly to help their understanding.

Forensic Chemistry of Substance Misuse: a guide to drug control

Subject area
Drug Legislation, Forensic Science

Description
This book provides the reader with a comprehensive guide to drug control legislation in the United Kingdom with particular emphasis on chemical structure-specific controls

Authors
Leslie A King

Publishers/Suppliers
The Royal Society of Chemistry <www.rsc.org>

Date/Edition
2009

ISBN
978-0-85404-178-7

Level
Professional

Price
£49.95

Drug control legislation is rarely out of the public domain mostly in part due to the changes in classification of cannabis and the increase in use of designer drugs and 'legal highs'. Leslie King is widely regarded as an authority on the chemistry and legislation of drugs and their precursors providing advice on this subject to both the UK Government and international agencies.

Summary Review

range: * poor to ***** good	
Academic content	****
Usefulness to student	****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

The author has successfully expanded the content of his initial book on the Misuse of Drugs Act[1] aimed at forensic scientists, to appeal to a wider audience namely criminal lawyers, police and customs officers, graduate and postgraduate students and teachers. This book provides the professional and academic community with an indispensable guide to the drug control legislation in the UK.

Chapters 1 to 5 provide an introduction to drug misuse, a brief overview of the history of drug control in the UK and an insight into European and International influences. Chapter 6 deals with 'Generic Controls in the UK' in greater depth describing those based on salts, ethers and esters and specifically the control of stereoisomers before dealing with the generic classification of a range of substances including anabolic steroids, cannabinols, pentavalent derivatives of morphine, phenethylamines and tryptamines.

Chapter 7 highlights problem areas relating to the control of natural products (cannabis, opium, poppy-straw and magic mushrooms) due to issues relating to identification and definition of the various forms. The author goes on to suggest a new definition of opium which could be inserted into the Misuse of Drugs Act but concedes that this would not solve the issue of how an analyst would distinguish opium from poppy-straw. Chapter 8 continues with a review of 'Other Problems of Chemical/Legal Interpretation' examining specific examples due to the chemical form, purpose of use or purity and including reference to legal challenges.

Chapters 9 and 10 guide the reader through a comprehensive list of compounds to be considered for future control, and compare generic and analogue controls introduced in New Zealand and the USA respectively. Chapter 11 charts 'The Drug Classification Debate' from the first review by the Advisory Council on the Misuse of Drugs (ACMD) in 1979 through the reclassification of cannabis (2001-4) to the most recent review of cannabis in 2007-8. The author provides insight into the so-called *precautionary principle* used by the UK government who have *erred on the side of caution* due to the possible harmful mental health effects of cannabis. The government has ignored the advice of the ACMD who recommended cannabis remain a Class C drug. Cannabis is expected to be reclassified as a Class B drug by the end of 2009.

Gail Cooper
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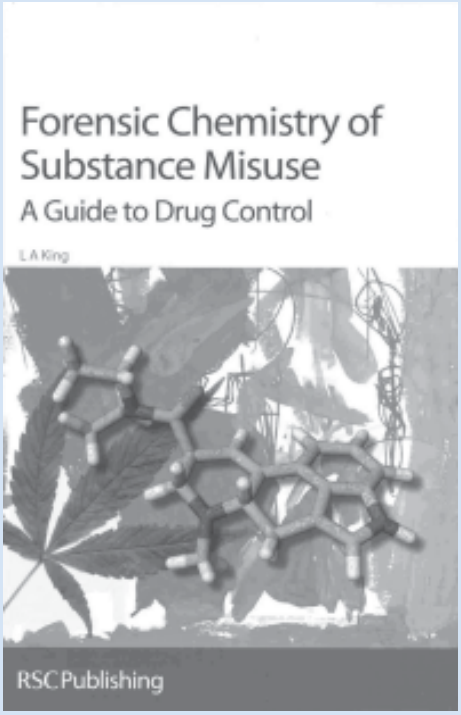
University Place
University of Glasgow
Glasgow G12 8QQ
November 2009

Forensic Chemistry of Substance Misuse: a guide to drug control



From the publisher...

Forensic Chemistry of Substance Misuse A Guide to Drug Control

By Leslie A King

This book builds on an earlier publication by the same author: The Misuse of Drugs Act: A Guide for Forensic Scientists. It provides a chemical background to the domestic and international legal controls on drugs of abuse and related substances and includes coverage of 'designer drugs' and generic/analogue controls from the UK, US and New Zealand perspectives.

978-0-85404-178-7 276pp 2009 £49.95

The 20 appendices contain a vast amount of additional technical material including related legislation, drug precursors, derivatives of tryptamines and related stated cases. Of particular note is the inclusion of 'Profiles of the Major Drugs of Misuse' for amphetamines, cannabis, cocaine and crack, heroin, LSD, MDMA and methylamphetamine. Although alternative comprehensive texts are available, the brief profiles listed in this book are an excellent single-source summary for students and professionals alike.

This book is a must-have reference guide for professionals involved in drug enforcement and will be a valuable teaching aid in undergraduate and graduate chemistry and forensic science programmes.

Reference

1. *Misuse of Drugs Act: A Guide for Forensic Scientists* (2003)

Forensic Science Laboratory Manual and Workbook

Subject area
Forensic Science

Description
A laboratory companion to *Forensic Science: An Introduction to Scientific and Investigative Techniques* and other undergraduate texts, this book provides a range of basic, hands-on experiments that can be completed with inexpensive and accessible instrumentation, for non-science majors and for use at both the high school and college level

Authors
Thomas Kubic and Nicholas Petraco

Publishers/Suppliers
CRC Press <www.crcpress.com>

Date/Edition
2009/3rd edition

ISBN
978-1-4200-8719-2

Level
Undergraduate

Price
£19.99

Summary Review	
range: * poor to ***** good	
Academic content	***
Usefulness to student	***
Usefulness to teacher	****
Meets objectives	***
Accuracy	****

If you are looking to set up a series of forensic practicals for a first year undergraduate module or a series of practicals at school; then I would recommend this book.

It covers most of the basic forensic science techniques such as fingerprint lifting and examination, hair examination through to some of the more specialised forensic science disciplines such as Forensic Anthropology, Forensic Odontology and Bloodstain Pattern Analysis; at a level suitable for first year undergraduates. These exercises are appropriate to the level of students that this book is aimed at and is presented in such a way that passes on the fundamental principles to the student without overwhelming them or boring them.

Each chapter is interspersed with more 'dry' subjects, such as the importance of the chain of custody and packaging. It also has a number of practicals addressing the principles of identification and individualisation. The authors appear to have gone to a lot of effort to present such subjects in an interesting fashion and introducing such concepts alongside more 'exciting' subjects.

The way the book is presented is also quite interesting. It consists of perforated pages with holes punched in it. The intention is obviously for each student to buy this book and follow it in a series of practical sessions throughout an academic year.

With this in mind, I do not feel that this book would be suitable for distribution to all students. It is rather out of date. It has a chapter on developing black and white films and the chapter on Basic Photography is also out of date. It does have a chapter on Digital Photography tucked away at the back; this should be brought front and centre. It keeps referring to imperial measurements where metric measurements are more appropriate.

Each chapter also comes with a series of exercises and I feel that these do not necessarily provide enough support. For example, one of the exercises frequently given is 'justify your conclusions'. This is a rather sweeping exercise to do without any sort of support. It might be of benefit to include a chapter introducing basic interpretational principles so any request to 'justify your conclusions' can be carried out more reliably and in a more constructive manner.

My biggest issue with this book is the relatively poor quality of the images. In some cases, the resolution of the pictures are quite poor and some are positively amateurish. All the images are also in black and white. Given the subject content of this book, I feel that much more effort and thought should have been given to the quality of said images.

Although I do not feel that this book is suitable for distribution to students, it would be invaluable to any academic or technical staff who wishes to develop and/or overhaul a first year forensic practical module. However, I would suggest that such staff prepare their own practical sheets and update the images and diagram with better quality ones and in colour.

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November 2009

Fundamentals of Sustainable Chemical Science

Subject area
General Chemistry, Sustainability

Description
This text elucidates the basics of chemistry with tie-ins to environmental chemistry and green chemistry

Authors
Stanley E Manahan

Publishers/Suppliers
CRC Press (Taylor & Francis Group) <www.crcpress.com>

Date/Edition
2009

ISBN
978-1-4398-0239-7

Level
Undergraduate

Price
£34.99

Summary Review	
range: * poor to ***** good	
Academic content	***
Usefulness to student	****
Usefulness to teacher	**
Meets objectives	****
Accuracy	****

Education for Sustainable Development (ESD) is gaining an increasing profile in Higher Education and indeed is now considered a priority area for Higher Education Academy Subject Centres. Hence a book entitled **Fundamentals of Sustainable Chemical Science** authored by Stanley Manahan, a leader in the field of environmental chemistry for the past 40 years, raises much interest. However it needs to be pointed out that the book is designed to provide a basic introduction to chemistry for readers with little or no prior background in the subject, with tie-ins to environmental and green chemistry.

Chapter 1 consists of what the author refers to as a 'mini-course' in chemistry covering the most basic concepts and terms needed to understand chemistry, eg atoms, elements and molecular mass, but also includes detailed discussion of significant figures and conversion factors. Chapter 2 introduces physical and chemical properties, states of matter and moles, again assuming the reader has little prior knowledge. Chapters 3 to 5 then build on this foundation to cover compounds and their reactions, underpinned by simple mathematical aspects, such as stoichiometric calculations. Chapters 6 to 8 cover other essential chemical areas, namely: acids, bases and salts; solutions and solvents; and chemistry and electricity. Chapter 9 gives a very brief introduction to organic chemistry and chapter 10 to biological chemistry; these two chapters include a list of supplementary references relating to the chapter topics, but not to sustainable science. Each chapter has at the end a two to three page summary. These have blanks in them to be filled in by the reader as a means of reviewing the main points covered; answers are given at the end of each summary. Each chapter also has about 50 questions and problems, but without answers.

As a basic chemistry course, this book could be particularly useful for foundation degree students returning to chemistry after a break or students being introduced to chemistry as part of another degree subject, although the price may prove prohibitive. It would be of limited value to teachers, in that aspects of sustainable chemical science are covered only superficially. Of more value in this respect would be some of Stanley Manahan's other books, such as *Environmental Chemistry*[1] and *Environmental Science and Technology*[2], or the range of books on environmental chemistry published by the Royal Society of Chemistry[3].

Although there are relatively few errors in the main text of the book and in the chapter summaries and problem pages, curiously the preface refers to the book as *Fundamentals of Environmental Chemistry 3rd Edition*, a similar book by this author but with a far higher content of sustainable science[4].

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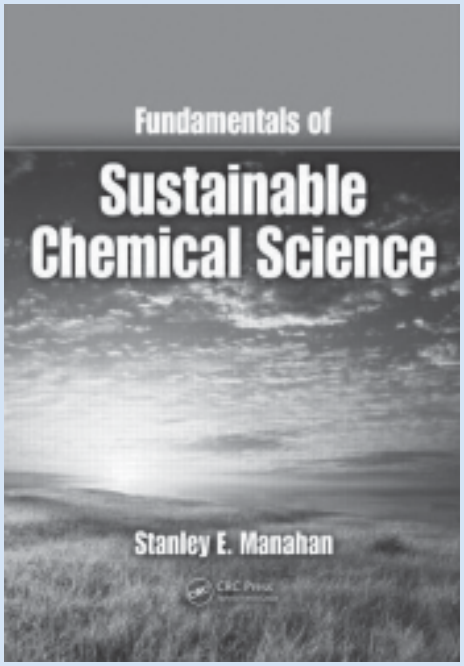
November 2009

Continued on page 28

Fundamentals of Sustainable Chemical Science



From the publisher...

Fundamentals of Sustainable Chemical Science

By Stanley E. Manahan

The book begins with an introduction to the basic concepts and terms needed to really understand chemistry. With these terms defined in very fundamental ways, it is then possible to cover chemical concepts in greater detail without having to guess what readers know and don't know about chemistry. The book also includes basic coverage of organic chemistry and biochemistry. Although other books at the beginner level often omit these topics, those who deal with the real world of environmental pollution, hazardous wastes, agricultural science, and other applied areas quickly realize that a rudimentary understanding of them is essential. These two features make the book not only unique but also practical.

978-1-4398-0239-7 392pp 2009 £34.99

Continued from page 27

This book succeeds as a clear and concise introduction to chemistry. As a contribution towards ESD, which the title might suggest, the book provides only enough material to stimulate an interest. A list of supplementary references on sustainable chemical sciences, including some of the author's own excellent texts, would have been very useful.

References

1. Manahan, Stanley E, *Environmental Chemistry*, 9th Edition, CRC Press, Boca Raton (2009).
2. Manahan, Stanley E, *Environmental Science and Technology: A Sustainable Approach to Green Science and Technology*, 2nd Edition, CRC Press, Boca Raton (2006).
3. Royal Society of Chemistry Publishing, Environment Subject Area.
4. Manahan, Stanley E, *Fundamentals of Environmental Chemistry*, 3rd Edition, CRC Press, Boca Raton (2008).

Giving a Lecture: from presenting to teaching

Subject area
Education

Description
This is a resource for those new to teaching at the University and College level and for those who just want to reflect upon and refresh their lecturing practice

Authors
Kate Exley and Reg Dennick

Publishers/Suppliers
Routledge (Taylor & Francis Group) <www.routledge.com>

Date/Edition
2009/2nd Edition

ISBN
978-0-415-47140-4

Level
Teachers

Price
£17.99

Mark Glynn
Institutes of Technology of Ireland
Fumbally Lane
New Street
Dublin 8
Ireland
November 2009

This book is a must read, not just for new lecturers, but also experienced lecturers who want to reflect on their practice. I would also recommend this text to teaching assistants, tutors and those generally interested in educational and staff development in both Higher and Further Education environments.

Summary Review

range: * poor to ***** good

Academic content	****
Usefulness to student	***
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

Feedback is crucial when it comes to effective teaching. By accepting feedback on the first edition these authors have refined and updated a publication that already was excellent to start with.

What a lecturer teaches does not always match what a student learns. This book shows how lecturers can stimulate students to think and not just learn material off by heart. How should you prepare for the first day of class? How can you encourage all students to participate in discussions? How do you ensure disabled students are catered for in your lectures? Increasingly, universities are drawing from a less traditional group of students – international students, disabled students, part time students, and mature students. This book offers specific, practical advice on the issues that teachers encounter when teaching in a diverse classroom. With reference to the international literature, and discussing some of the educational principles that underpin an inclusive curriculum, this book covers a wide range of useful topics so that teachers will have quick access to guidelines on different aspects of teaching and learning. The second edition provides:

- A new chapter on podcasting and e-lecturing
- Updated research and suggestions on the effective use of PowerPoint
- Guidance on using interactive handsets for active learning and engagement
- Consideration of the role of lecturers in problem based learning courses

The need to tailor teaching approaches to meet the demands of different subject areas and to provide new teachers with examples of practice that are easily recognisable in their fields of study, is addressed within this text. The book includes numerous examples from a wide range of academic subjects in different institutions. Examples are included throughout every chapter giving the reader a comprehensive overview of techniques used by experienced lecturers. The authors assume that the reader is literally starting from scratch when it comes to teaching. As a result the text is ideal for those interested in pursuing a career in education.

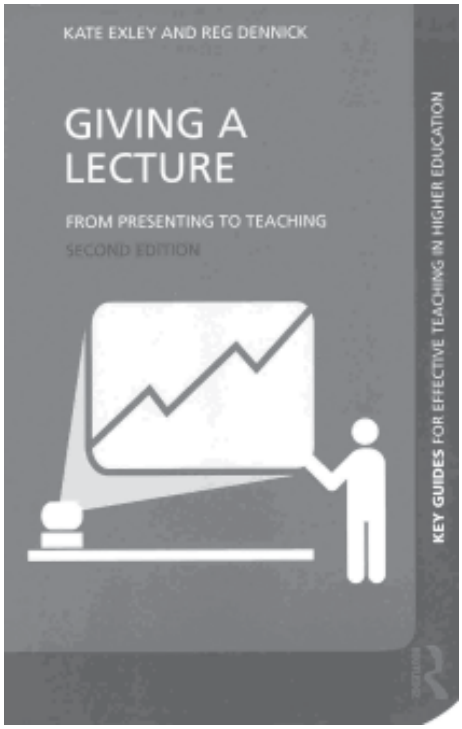
This handy guide uses a multi-disciplinary approach based on sound educational theory to provide clear guidance and engaging ideas on giving a memorable and motivational lecture. Readers will find its straightforward approach is both readable and very practical.

Continued on page 30

Giving a Lecture: from presenting to teaching

Continued from page 29

The book offers much needed support and guidance for new and part-time teachers in further and higher education, covering a wide range of teaching scenarios. It will also be critical reading for all those who wish to refresh or invigorate their teaching. The first four chapters of the text give the basics covering headings like why lecture, how to use your voice properly, and structuring and sequencing lectures. The latter half of the text is where this book differentiates itself from its competitors.



Chapter five
In addition to the examples from numerous disciplines mentioned earlier, the authors devote an entire chapter to handling nerves, anxiety and discipline. The everyday examples of issues that may confront a new lecturer are accompanied by suggested solutions and their associated implications. *Some of the worlds greatest performers still get 'stage fright'.* This book does not claim to eliminate nerves but does recommend how to keep them under control. By using case studies from a variety of disciplines this chapter offers useful tips and techniques to handle nerves, anxiety and classroom discipline.

Chapter six
Recognising the prevalence of PowerPoint in lecture theatres this chapter includes a major section on this tool. The chapter suggests ways to avoid common pitfalls using PowerPoint and highlights some interest tips and research on the entire area; for example how many slides you should actually have and how much content on each slide. In addition to PowerPoint this chapter also discusses other ways of presenting materials ie interactive whiteboards, flip charts, and overhead projectors etc.

Chapter seven
Most hard copy materials are increasingly supplemented or indeed replaced with a range of online learning materials. Most colleges provide electronic versions of lecture handouts via their learning management systems. In this chapter the authors examine why handouts are used, and looks at the factors that make handouts effective.

Chapter eight
In this chapter the authors encourage lecturers to use a variety of mechanisms to increase the interactive element of their lectures. Highlighting reasons why you should have interactivity while at the same time addressing common challenges and possible ways forward. This chapter uses very clear tables supported by real case studies to support the benefits of active learning. The three fundamental ways in which the lecturer can vary what students experience in a lecture; What students hear, see and do. This chapter is constructed around these dimensions and focuses on the students experience in the class

Chapter nine
This chapter explores the use of technology into and supporting lectures. This chapter highlights recent research conducted into the use that students are making of these new learning resources. This chapter breaks down potentially complicated tasks into simple steps and short guides.

Chapter ten
There are some students in every group who have more specific learning needs. This chapter provides a gateway to thinking about support them in your lecture. Needs of learners of example with visual or hearing difficulties in addition to learners with frequently occurring learning disabilities eg dyslexia are discussed in this chapter

Chapter eleven
The book finishes with a final chapter on evaluation and development of your lecturing. As with all of the chapters before, this material is backed up with real life examples and solid tips and solutions to common issues in the classroom.

The entire text was easy to read from start to finish and will prove useful to anybody interested in the field of education.

Introduction to Astronomy and Cosmology

Subject area
Astronomy, Physics

Description
An introductory text for undergraduate students of astronomy, cosmology or physics when appropriate modules are being studied

Authors
Ian Morison

Publishers/Suppliers
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2008

ISBN
978-0-470-03334-0

Level
Undergraduate

Price
£32.50

Summary Review

range: * poor to ***** good

Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

This text is very ambitious, for how does one introduce astronomy and cosmology in anything but a superficial way in just 333 heavily illustrated pages? The author arranges the material in nine chapters; 'Astronomy, an Observational Science', 'Our Solar System 1 – The Sun', 'Our Solar System 2 – The Planets', 'Extra-solar Planets', 'Observing the Universe', 'The Properties of Stars', 'Stellar Evolution – The Life and Death of Stars', 'Galaxies and the Large Scale Structure of the Universe' and 'Cosmology – The Origin and Evolution of the Universe'. Each chapter, with the exception of chapter nine, concludes with set of questions allowing the reader to test their understanding. Unfortunately the text does not offer a set of answers. Given that many questions are of the form: "The newly discovered 'dwarf planet', Eris, has an elliptical orbit with a semi-major axis of 67.89AU. Calculate its period in years." This would have been simple to address. Perhaps each chapter could also have concluded with a summary of key points, as a useful revision aid for students. In addition the opportunity for a set of more textual, perhaps more philosophical, questions following chapter nine was lost.

Given the breadth of the material covered in the text it is inevitable that Einstein's gravitational theory, particle physics and quantum phenomena are introduced at appropriate points. The author, however, takes things a little further and introduces dark matter, dark energy and string theory all at an appropriate and generally accessible level, quite an achievement!

Even if the reader was not told in the preface it would, I feel, be evident that this text started life as a series of lectures given by the author to undergraduate students. This is both its success and its minor failing. In terms of success it is colourful and contemporary and offered in manageable, and self contained, blocks of information as would befit a pedagogically sound lecture programme. The author has paid attention to the language and pace of the narrative which draws the reader in and helps them along the road to understanding. The one exception, as noted by Rowland[1], being his stressing the correct use of 'The General Theory of Relativity' on page 34 only to misquote this as 'The Theory of General Relativity' in the summary on page 36.

The text does, however, almost require the reader to ask questions of the author, perhaps these did get asked at the end of the lectures or in a tutorial, for a complete understanding. For example some of the excellent diagrams are not always as clear as they could be and, in parts, the mathematics moves from line to line in a manner that a number of readers may find difficult. Given the introductory nature of the material perhaps less material or a longer text would have made it more self contained. A *mathematics for astronomy and cosmology* appendix could have been included to help those in need without breaking the flow of those more able to cope. Whilst I would agree with the author's jacket notes "complex mathematics are not required to use this book" I would argue that it is not the complexity but rather the application of the mathematics which may need further explanation.

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Clifton Campus
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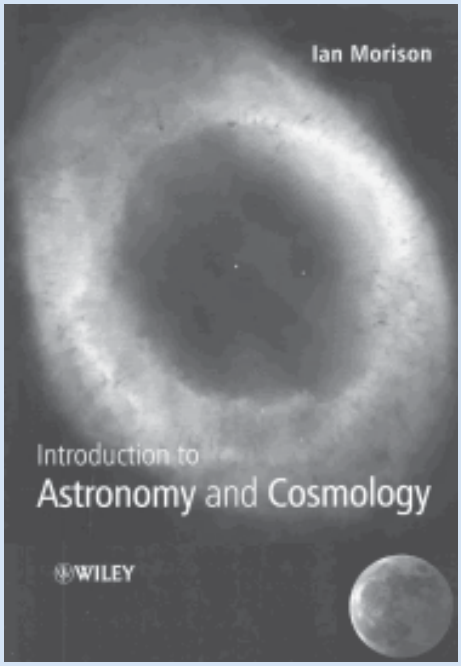
November 2009

Continued on page 32

Introduction to Astronomy and Cosmology



From the publisher...

Introduction to Astronomy and Cosmology

By Ian Morison

Introduction to Astronomy & Cosmology is a modern undergraduate textbook, combining both the theory behind astronomy with the very latest developments. Written for science students, this book takes a carefully developed scientific approach to this dynamic subject. Every major concept is accompanied by a worked example with end of chapter problems to improve understanding.

978-0-470-03334-0 360pp 2008 £32.50

Continued from page 31

In conclusion the author undertook a mammoth task and produced an excellent text; it must have been a pleasure to sit through the lecture series as his enthusiasm shines out from the page. The text would add to the library of anyone teaching, or studying, astronomy or cosmology at undergraduate level and similarly colleagues teaching a GCE Advanced level physics specification which includes astronomy will find a great deal of extension material for themselves and their students. The minor points of omission referred to should not distract from the text as a whole and I doubt a better introductory text is currently available.

Reference

1. Rowland J (2009) <www.astronomynow.com/books/AstronomyNow-BookReview-IntroductiontoAstronomyandCosmology.html> (accessed 21st October, 2009).

Introduction to Light Emitting Diode Technology and Applications

Subject area
Electronics

Description
A concise description of the LED and its applications, including the development of organic light emitting diodes

Authors
Gilbert Held

Publishers/Suppliers
CRC Press (Taylor & Francis Group) <www.crcpress.com>

Date/Edition
2008/1st edition

ISBN
978-1-4200-7662-2

Level
Access, foundation

Price
£35.99 (hardcover)

Summary Review	
range: * poor to ***** good	
Academic content	*
Usefulness to student	*
Usefulness to teacher	**
Meets objectives	**
Accuracy	*

'You can't judge a book by looking at its cover'. It's an old saying and an old song, but no less true for it. In my case, it wasn't so much the cover as the title and my own sense of expectation. I have worked in semiconductor physics for most of my professional life and I expected a book on the physics and technology of light emitting diodes as much as a book on applications. This is not such a book. It's quite slim and concentrates more on the applications than the science behind the devices. The writer is a professional author and a quick look at the web reveals a number of technological books to his name. It's no surprise then that in places the writing is crisp, lucid, and displays the sort of touches that convince the reader the authors knows what he's on about. The chapter on organic LEDs, for example, is, if you'll excuse the pun, illuminating, but on the topic of their development and commercialisation rather than on the technicalities of their operation.

This is an important caveat because the quality of the scientific and technical explanations is, I believe, a major deficiency with this book. These are at once both simplistic and too complicated, to the extent in places of being unintelligible. I formed a poor opinion of this book after reading just a few pages and having formed such an opinion it was difficult then to read some of the later, and much better, sections with an open mind. Any book that puts off its readers in the first few pages has to be doing something wrong.

To give you an example, on page 3 Held describes the application of a forward bias to a p-n junction, having explained briefly what these concepts are; "The net effect of the positive and negative terminal connections is to push the electrons and holes toward the p-n junction, lowering the barrier potential required to reduce the non-conducting depletion zone so that it becomes so thin that charge carriers in the form of electrons can tunnel across the barrier p-n junction by increasing the forward bias voltage".

I'm not quite sure what this means, but it's wrong on so many levels. Electrons and holes are not *pushed* anywhere as current in a forward bias junction is diffusive. Moreover, it's not the movement of charge that lowers the barrier, but the applied voltage and tunnelling does not occur in forward biased p-n junctions. It is a specific quantum mechanical concept that has no place here. Moreover, this is only page 3 and there has been no prior mention of tunnelling or potential barriers. I fear that to any student whose knowledge is so limited as to need explanations as basic as these will find such passages unintelligible.

Nor is this an isolated example. On page 4 he writes of non-radiative transitions in silicon "which results in no optical emission as the semiconductor represents indirect band-gap material. However, through the use of gallium arsenide and other materials a direct band gap with energies corresponding to near infrared, visible, or near-ultraviolet light could be generated by the evolving LED". Does an LED evolve? If it does, is a direct band gap generated by it? My favourite section for sheer unintelligibility is on page 34, where Held describes colour coordinates. He

Continued on page 34

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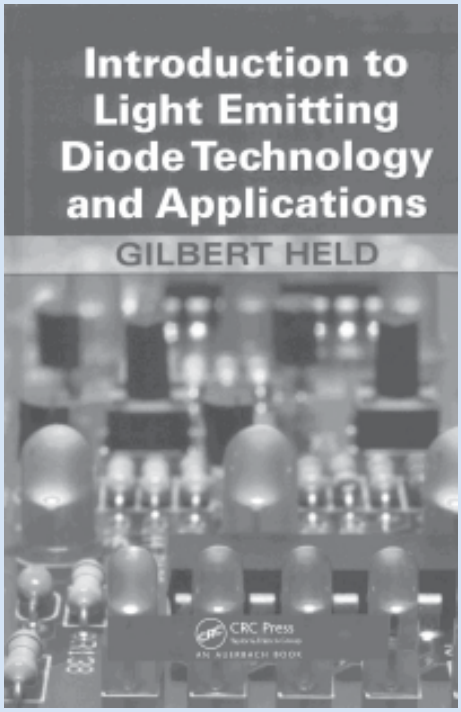
November 2009

Introduction to Light Emitting Diode Technology and Applications



From the publisher...

Introduction to Light Emitting Diode Technology and Applications

By Gilbert Held

The book begins with a brief history of the effort to enable the device that generates light through modern organic LEDs and reviews the fundamentals and principles of light prior to a detailed explanation of how LEDs generate different colors. After forming this basic foundation, the book examines the key LEDs in lighting and communications. It then discusses the latest opportunities and advancements in high brightness (HB) LED technology, solid state lighting, and handheld electronic applications.

978-1-4200-7662-2 192pp 2008 £35.99

Continued from page 33

talks of saturation and hue, of adding negative red, and of "the center point on the blue-green edge of the [Maxwell] triangle" not being "as saturated as the spectral cyan". I'm sure that means something to a colour scientist, but not to me. I knew nothing of colour coordinates prior to picking up this book and on reading it my knowledge has improved not one jot.

Held explains that he has deliberately kept the first chapter simple, because he deals with the p-n junction in more detail in chapter 3. That may be so, but brevity is no excuse for these sorts of errors. Unfortunately the technical explanations do not get any better as the book proceeds. As well as those mentioned above there are diagrams of parallel circuits in which the LEDs are shorted out. Band structure is introduced in chapter 3 with the assertion that bands of states exist in atoms, implying that bands in solids are a simple extension of an atomic picture. On the contrary, even a simple model of electronic bands involves a great deal of physics. It would have been far better in my view to have said something to the effect that in a solid atomic energy levels are modified by the close proximity of other atoms. In this way students would at least be aware that they are reading a simplified view.

Personally, I'm a little wary of simplified explanations. There is a danger that weaker students in particular accept them too readily at the expense of the more complicated representations we want them to understand. I suppose it's a matter of deciding what is appropriate for the intended readership. On the face of it the readers of this book are not expected to be very advanced, but that only makes the use of complicated terms more puzzling. This is not a book I would want my students to read. There are simply too many errors in the science and I would be too concerned about the understanding that students would take away. As for academic staff, there might be elements of the book that are useful. As I have described, some of the writing on the applications is insightful, but the hardback is expensive for what you get and given my concerns it is hard to recommend it.

Introduction to the Principles of Material Evaluation

Subject area
Materials Science

Description
An introduction to the key physical properties of materials and the ways in which they can be measured, both destructively and nondestructively. The methods are set in an industrial context by coverage of the economic and probabilistic aspects of inspection

Authors
D C Jiles

Publishers/Suppliers
CRC Press (Taylor & Francis Group) <www.crcpress.com>

Date/Edition
2007

ISBN
978-0-8493-7392-3

Level
Undergraduate

Price
£53.99

Tony Harker
Department of Physics and Astronomy
University College London
Gower Street
London WC1E 6BT
November 2009

Summary Review

range: * poor to ***** good

Academic content	***
Usefulness to student	****
Usefulness to teacher	****
Meets objectives	*****
Accuracy	***

Whenever we use materials, especially in safety-critical applications, we need to assess their fitness for purpose. This obviously happens at the design stage, when we assess the material's potential to provide the required properties and to maintain them in use. Once we have made something, it will be inspected (or, in mass production, samples will be inspected) before it is used. Finally, we may need to monitor it for in-service degradation. This book provides an overview of the methods that are used to make these assessments of the physical properties of materials.

The opening chapter sets the scene by offering a comparison of the key features of several nondestructive evaluation methods, under headings ranging from cost through sensitivity to the training needs for operators. The unifying feature of all the approaches is that they are active: that is, the operator inserts energy into the material and monitors what is returned (though other methods, such as acoustic emission, are mentioned briefly at appropriate points later in the text). The following chapters form, in effect, three sections. First, the physical properties of materials are reviewed. Then the technological applications of those properties to characterisation are discussed. Finally, operational and economic aspects of materials evaluation are covered.

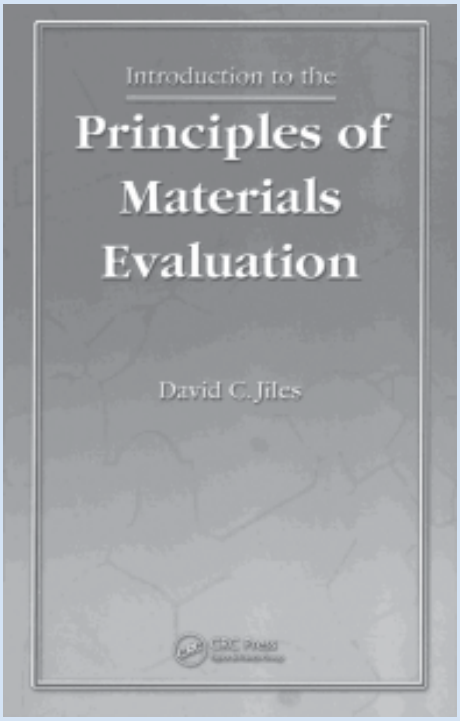
A description of a typical stress-strain curve and the various values, slopes and integrals that can be derived from it introduces the mechanical properties of materials. Elasticity is described in simple configurations, which are enough to underpin the material later in the book, and the four common hardness measures are explained. The next chapter picks up the elastic properties again and describes bulk elastic waves and some of their applications. Chapters 4 to 6 lay out the basics of thermal, electrical and magnetic properties and of x-ray interactions with materials.

The best part of the book is the wide range of techniques and of basic practical issues addressed in the chapters on mechanical, ultrasonic, electrical, magnetic, radiographic and thermal testing techniques. As a physicist, I often found myself trying to look behind some of the formulae presented for a little more justification, but given the scope of the work the level is entirely appropriate. There are well-chosen figures, and plenty of pointers to further reading.

The final three chapters provide a basis for the design of testing procedures. After a comparison of destructive and nondestructive methods, there is a brief description of the cost-benefit analysis of testing. This is followed by a chapter on detection probabilities, leading finally to a consideration of the sorts of decision that can be based on non-destructive evaluation, and the issues of lifetime extension of plant and equipment and the concept of retirement for cause.

Continued on page 36

Introduction to the Principles of Material Evaluation



From the publisher...

Introduction to the Principles of Materials Evaluation

By David C. Jiles

Choosing the proper material testing technique is important not just for economic reasons; in many circumstances, it can save lives. Building on the common links among all types of material evaluation methods, Introduction to the Principles of Materials Evaluation presents a thorough examination of all types of destructive and nondestructive testing methods, focusing on the advantages and practical utility of each. It offers students the opportunity to learn the underlying physical principles, rather than a laundry list of techniques, to make sure they choose the right method.

978-0-8493-7392-3 304pp 2007 £53.59

Continued from page 35

In some places the order of presentation of material could be improved. For example, Chapter 3 talks about some specific applications of ultrasound to measurements, which are the topic of Chapter 8. On the other hand, Rayleigh waves, a basic physical phenomenon, are described in Chapter 8 rather than in Chapter 3. As a consequence of this loose arrangement, Figure 3.5 is essentially the same as part of Figure 8.3, but mentions surface waves which have not been introduced yet. There is also an air of a book that has been finished in a hurry: Figure 2.4, which is the same as Figure 7.2, is captioned “Plot of stress vs. strain for a specific material”: why not say what material? A reference on page 122 ends “(Journal/ volume/page/date coordinates?).” Some diagrams are of a low quality, yet enough time has been taken to add new labels to them: why not redraw them. Also, in several places characters have been omitted from equations.

The material presented here fulfils the author’s aim of giving an undergraduate introduction to materials characterisation. The field provides a rich crop of examples of physics in action, and one can imagine it also being used as a jumping-off point for problem-based learning exercise in the wide range of physical phenomena it includes.

Molecular Design: concepts and applications

Subject area
Molecular Sciences

Description
An introductory-level textbook on the design of small molecules

Authors
Gisbert Schneider, Karl-Heinz Baringhaus (Foreword by Hugo Kubinyi)

Publishers/Suppliers
Wiley-VCH (John Wiley and Sons) <eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2008

ISBN
978-3-527-31432-4

Level
Undergraduate, research, professional

Price
£45.00

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September 2009

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

On Wiley's website[1] the introduction states, "This first introductory-level textbook on the design of small molecules is written with the first-time user in mind. Aimed at students and scientists alike, it uses computer-based methods to design and analyze such small molecules as drugs, enzyme inhibitors, probes and markers for biomolecules." and as such, to paraphrase, 'it does what it says on the tin'.

Where undergraduates are concerned I would only be prepared to expose a final year project student with an extremely sound work ethic, strong chemistry and A-level (or higher) mathematical background to this text. That student would have to be prepared to take on a challenging read due to the fully comprehensive nature of the text. Even then I would only suggest a student use the text in support of a research project in the modelling area. A physical and/or life postgraduate student or professional scientist wishing to be exposed to the marvels of what can be achieved in today's realm of molecular modelling and design could not ask for a better book.

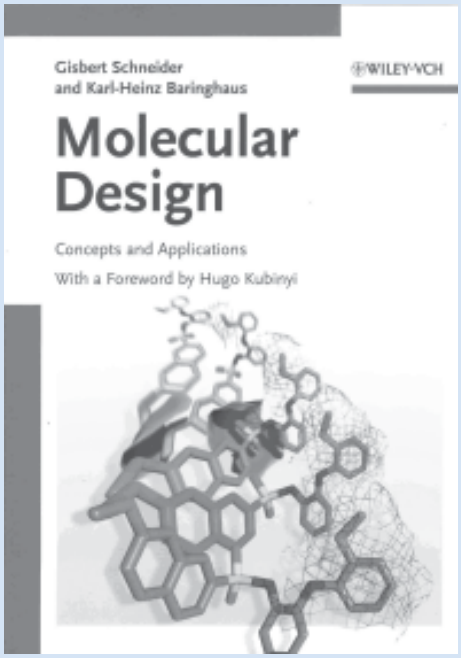
The text takes the reader efficiently through (i) molecules as objects, their 1D (string representations) and more familiar 2D and 3D representations into the consideration of their use in virtual screening and computer aided molecular (CAM) modelling, (ii) how molecules interact with their receptors and how to quantify the 'lock and key' ideas, (iii) the need for CAM design, (iv) the pitfalls of virtual screening and how to avoid them where possible and (v) the slightly more esoteric 'machine learning' methods of automated lead finding and optimisation. My favourite chapters, for style and content, are those on 'Creating the design' and the particularly strong 'Virtual Screening Triage' a great title that typifies how small molecule modellers should approach the subject. The triage chapter contains case studies of successful de novo design for ligands of the cannabinoid receptor, ligand screening of a natural product derived combinatorial library as l5-lipoxygenase inhibitors and design of potassium ion channel (Kv1.5) modulators - all highly topical and up to date.

In terms of meeting the authors objectives, I have no doubt that the tour they lead is more than able to prepare the careful, considered reader for their initial and indeed further adventures in molecular design well supported by highly appropriate references.

This stylish book reads incredibly well and, as with many Wiley-VCH texts, the publishers, their designers and the authors, with substantial effort, have told their story via a beautiful book that is a pleasure to have on the shelf. There is an extremely good balance of written and visual explanation versus a prerequisite formulaic mathematics that is judiciously employed. The accuracy and rigour with which this book has been crafted is a credit to both the authors and their associated editors. I will be guarding my copy jealously and all comers can go and take out the copy we already have in our library.

Continued on page 38

Molecular Design: concepts and applications



From the publisher...

Molecular Design: Concepts and Applications

By Gisbert Schneider, Karl-Heinz Baringhaus, Hugo Kubinyi (Foreword by)

This first introductory-level textbook on the design of small molecules is written with the first-time user in mind. Aimed at students and scientists alike, it uses computer-based methods to design and analyze such small molecules as drugs, enzyme inhibitors, probes and markers for biomolecules. Both authors have extensive practical experience of modeling and design and share their knowledge of what can and cannot be done with computer-assisted design.
Divided into four sections, the book begins with a look at molecular objects and design objectives, including molecular geometry, properties, recognition and dynamics. Two further sections deal with virtual synthesis and screening, while the final section covers navigation in chemical space.

978-3-527-31432-4 277pp 2008 £45.00

Continued from page 37

Far be it for me to offer any criticism, however, for some scientists the book title might suggest a broader application than just 'drug-like' molecules but I also know how difficult this can be for authors, being in the preliminary stages of naming a forthcoming book on aspects of this very topic.

Reference

1. <eu.wiley.com/WileyCDA/WileyTitle/productCd-3527314326.html>

Molecules that Changed the World

Subject area
General Science

Description
This book introduces the world's most important molecules and shows in a fascinating way the role certain compounds have to play in our everyday lives in the fields of drugs, aromatics or vitamins

Authors
K C Nicolaou and T Montagnon

Publishers/Suppliers
Wiley-VCH (John Wiley and Sons) <eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2008

ISBN
978-3-527-30983-2

Level
General reader

Price
£29.95 (hardback)

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Dainton Building
University of Sheffield
Brook Hill
Sheffield S3 7HF
October 2009

Summary Review

range: * poor to ***** good	
Academic content	****
Usefulness to student	**
Usefulness to teacher	***
Meets objectives	*****
Accuracy	*****

Coffee table books are ten a penny in the art world. Any volume on a prominent painter, photographer, or artistic movement will require large, lavishly produced books with whole pages dominated by high quality images. These books are designed to be enjoyed as pieces of art in themselves. However, the very handsome, beautifully produced, **Molecules That Changed the World** is an almost unique proposition: a coffee table book on organic chemistry. But then many practitioners of this discipline would be keen to point out that organic synthesis is art. Whether one accepts this tenet or not, and I personally would, K C Nicolaou is surely one of the great modern figures working in this now mature discipline. Over 34 chapters, Nicolaou and his co-author Montagnon (A former postdoctoral fellow in the Nicolaou group) focus on the stories behind the synthesis of a few dozen molecules, and in doing so they present nothing less than a total history of organic synthesis.

After two forewords from Nobel Laureates E J Corey and Ryoji Noyori and a preface by the authors have set the scene, the first chapter briefly outlines how the theoretical understanding of atoms, molecules, and elements developed to provide the raw materials, or palette, available to the synthetic chemist. From here, the second chapter swiftly focuses on those first triumphs of the early nineteenth century: Wöhler's synthesis of urea and, less than two decades later, the first example of carbon-carbon bond formation in Kolbe's synthesis of acetic acid.

Chapter three presents, and places into context, the pioneering work of Emil Fisher on glucose. Fisher's contributions on chirality and the 'lock and key' hypothesis of enzyme action are also touched upon.

Aspirin provides the theme for Chapter 4. Starting in the eighteenth century with the first clinical trials investigating the efficacy of pulverised birch bark in treating fever, the story moves through the industrial synthesis of aspirin in the early twentieth century, through the discovery of prostagladins and the elucidation of aspirin role as a COX inhibitor, ending in the twenty-first century with the withdrawal from the market of certain COX-2 inhibitors.

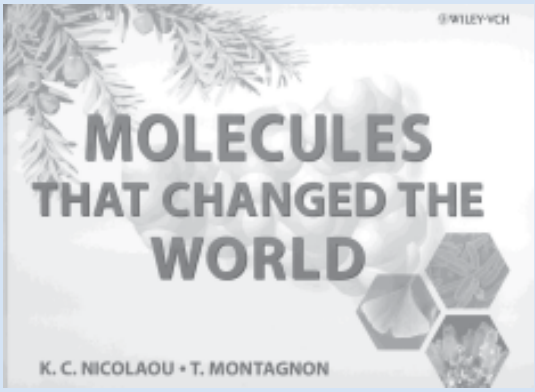
The chapters that follow take a similar approach as the challenges presented by camphor, terpineol, tropinone, haemin, quinine, and morphine are recounted. In these accounts, and indeed throughout the book, the work of individual scientists is emphasised and accompanied by succinct biographical data and portrait photographs. In this segment of the book limelight falls upon hugely important figures such as (amongst many others); Perkin, Grignard, Robinson, Woodwood, Stork, and Trost.

In Chapter 10, the reader is presented with the epic story of steroid synthesis and the leading players in the creation of the contraceptive pill. In the course of eleven wide-ranging pages brief histories of concepts such as conformational analysis, carbocations, and radicals are also presented.

Book-ended by short chapters on strychnine and longifolene, chapter 13 is dedicated to penicillin. With a cast of characters that includes Louis Pasteur, Paul Ehrlich, General Eisenhower, and Dorothy Hodgkin; Fleming's discovery of antibiotics and Sheehan's total synthesis of penicillin V are showcased.

Continued on page 40

Molecules that Changed the World



From the publisher...

Molecules That Changed the World

By K. C. Nicolaou, Tamsyn Montagnon

In this delightfully designed book, K. C. Nicolaou introduces the world's most important molecules and shows in a fascinating way the role certain compounds have to play in our everyday lives in the fields of drugs, aromatics or vitamins. For example, he tells the story of Aspirin, beginning 3,500 years ago in Egypt, through to its first synthesis and various applications with many entertaining facts and details. Printed in full color throughout and with its oversize format, this is a must for every chemist, natural scientist and anyone interested in the sciences.

978-3-527-30983-2 385pp 2008 £29.95

Continued from page 39

By chapters 15 and 16, on prostaglandins and leukotrienes, and vitamin B12 respectively, we reach the golden age of modern organic synthesis. The synthetic tool-kit was developing nicely and, thanks to advances in analytical chemistry, big molecular challenges were emerging.

In the last fifteen or so chapters, *all* the modern 'Everests' of natural product synthesis are discussed. From Amphotericin B, Palytoxin and cyclosporin to Taxol and Brevetoxin B, the biology and the researchers behind the molecules and their synthesis are presented in a lucid and lively style. Throughout this period certain figures such as Wender, Corey, Danishefsky - and Nicolaou himself- become recurring *leit-motifs* in the narrative. After chapters 31 and 32 which present work from the authors group, and others, on the last completed big molecular challenges, vancomycin and thiostrepton, the last two chapters move away from classical natural products.

Chapter 33 presents an overview on the chemical synthesis of a range of small organic molecules. Celebrity molecules such as sildenafil, fluoxetine, AZT, as well as the now highly newsworthy anti-influenza drugs are discussed. The final full chapter then rounds up biological macromolecules, such as insulin and EPO used as medications that are now being produced by modern biotechnology methods.

Molecules That Changed the World is printed on high quality paper and every page presents interesting paintings, pictures and images, most of which are in full colour. Additionally, in each chapter the authors select specific reaction highlights of syntheses shown in two colours.

This book raises an interesting conundrum: what readership is it aimed at? It is clearly not a conventional textbook or reference work. On the cover, Nicolaou and Montagnon state that it is suitable for teachers at high school, undergraduate, and graduate level, as well as readers with no formal background in science. I really think this is a little bit optimistic. To fully appreciate the chemistry in this book, the minimum requirement for any reader would be an understanding of the subject at around first year undergraduate level. In my opinion, apart from fellow researchers in this field, the people who will gain the most from this book will be teachers of undergraduate organic synthesis courses, particularly those on natural products and secondary metabolites, looking for colourful background details and information on the chemists involved in these enterprises.

Optics and Photonics: an introduction

Subject area
Optics, Photonics

Description
This book is an introduction to optics and photonics

Authors
F Graham Smith, Terry A King, Dan Wilkins

Publishers/Suppliers
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2007/2nd edition (reprinted with corrections 2008)

ISBN
978-0-470-01784-5

Level
Undergraduate

Price
£37.50

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University of the West of Scotland
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November 2009

Summary Review

range: * poor to ***** good

Academic content	****
Usefulness to student	****
Usefulness to teacher	***
Meets objectives	***
Accuracy	***

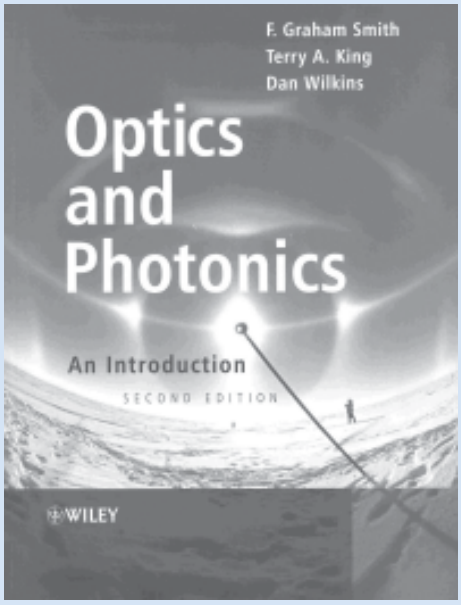
Optics and Photonics: an introduction (2nd Edition with corrections), by F Graham Smith, Terry A King and Dan Wilkins is at first sight something which most optics textbooks are not – that is, it appears to be very readable, and as such ought to be a good choice as recommended text for an undergraduate optics course. In the course of 21 chapters, the authors aim to cover the basics of the theory, from the nature of light through to modern developments in lasers and photonics. In their preface, the authors helpfully suggest groupings of chapters to be covered as the basis for a first course, chapters as extension material and further chapters for specialisation in, for example, communications engineering and biosciences. With such helpful structuring this book should then be ideal as the basis for an optics module consisting of minimal face to face lecturing and large elements of self study, backed up with laboratory sessions. In addition, there is an appendix listing recommended further reading for each chapter. For some chapters, this is helpfully subdivided into basic level texts and more advanced reading. For all these reasons, it was chosen as the recommended text in my department in the last academic year, when we were moving to a teaching model which placed more emphasis on self study, with less face to face teaching time.

Is the book then readable? Certainly, the style and layout are such that, especially at the start of each chapter, there is a literary rather than mathematical feel. This is enhanced by the use of quotations from various sources at the start of the chapters. Students may be lulled into a sense of comfort and security, supposing this to be a book they can read with the aid of a mug of coffee and a biscuit, rather than a pile of paper and a pencil. To be fair, certain chapters are indeed descriptive, containing less maths content, and thus easy to read and digest. Those students without a firm grounding in maths may well give up early in chapter 1 however, where a footnote casually states "Recall that ∇^2 is the Laplacian operator: ——". This then is my main criticism of this book: it assumes (in places) a certain level of mathematical competence without stating this explicitly. Problems at the end of chapters require in some cases the ability to perform fairly rigorous mathematical proofs, a skill which is sadly lacking in many undergraduates. Furthermore, the level of maths ability required even to follow the text varies from chapter to chapter. It could be argued that this is inevitable given the subject matter – Chapter 5, 'Electromagnetic Waves', for example, will inevitably be more challenging than a chapter on 'Spectra and Spectrometry' (Chapter 12).

A selection of problems is given at the end of each chapter, with numerical solutions to some of these at the end of the textbook. Full solutions are available to academics by e-mailing the publisher. I cannot vouch for these, as I resorted to providing my own tutorial problems. This was partly due to 'cherry-picking' chapters and parts of chapters in my guided reading list for students, and partly because I rapidly found that my students were struggling with the hidden maths content. All the students purchased the text, and all but one managed to acquire the reprint with corrections. We found no difference between these copies for the chapters we used.

Continued on page 42

Optics and Photonics: an introduction



From the publisher...

Optics and Photonics: An Introduction, 2nd Edition

By F. Graham Smith, Terry A. King, Dan Wilkins

The Second Edition of this successful textbook provides a clear, well-written introduction to both the fundamental principles of optics and the key aspects of photonics to show how the subject has developed in the last few decades, leading to many modern applications. Optics and Photonics: An Introduction, Second Edition thus provides a complete undergraduate course on optics in a single integrated text, and is an essential resource for all undergraduate physics, science and engineering students taking a variety of optics based courses.

978-0-470-01784-5 516pp 2007 £37.50

Continued from page 41

Did this text work for our students in the context of our university wide changed approach to teaching? Unfortunately, I have to conclude that it did not. The students found it difficult to engage with the text in those chapters with significant maths content: they found that many of the mathematical derivations and examples given were difficult to follow, resulting in extra tutorials being scheduled, negating the reduced contact time. Would I use this text again? The answer is yes, backed up with maths support material, perhaps using Moller's[1] text which gives *Mathcad* example worksheets on eg Cornu's spiral, which could be used in lectures.

In summary, this is a readable textbook, far more so than the more traditional text such as Hecht[2]. It has the merit of being in a compact format, thus easy to bring to lectures. Where it is lacking is in its assumption of prior maths knowledge. In the preface we are assured that the mathematical content is "without undue complication". This may be the case, but it has resulted in leaps of mathematical faith in places. As the epigraph at the start of Chapter 2, attributed to Richard Feynman, states "Optics is very simple or else it is very complicated". I found myself quoting this many times during my teaching of optics using this text.

References

1. Moller, K D *Optics, learning by computing, with examples using Mathcad*: Springer, (2003) +CD-ROM; (ISBN 0 387 95360 4)
2. Hecht, E *Optics* 4th Edn, International Edn, San Francisco; London: Addison-Wesley, (2002). (ISBN 0 321 18878 0)

Planets and Planetary Systems

Subject area
Astronomy

Description
The book aims to fulfil the objective of covering the subject, while being affordable and at a suitable level for an introductory undergraduate course

Authors
Stephen Eales

Publishers/Suppliers
Wiley-Blackwell (John Wiley and Sons) <eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2009/1st edition

ISBN
978-0-470-01693-0

Level
Access, foundation, undergraduate

Price
£27.50

Nicolas Labrosse
Department of Physics and Astronomy
University of Glasgow
Glasgow G12 8QQ
November 2009

Summary Review

range: * poor to ***** good

Academic content	*****
Usefulness to student	****
Usefulness to teacher	****
Meets objectives	*****
Accuracy	*****

The style of the book is very clear and will appeal to most students. I liked the way the author often refers to other sections of the book to connect various topics together and stress their relevance. He nicely puts his topic into the more general context of how scientific research is performed nowadays. The tale of the recent research on Mars carried out in the past couple of years is a fascinating account of how scientists devise tricks to learn about distant planets, and indeed reflects in many ways the beauty of scientific investigation (and not only in astronomy, as so many fields are involved in understanding planetary surfaces).

The personal style gives weight to the messages that Eales wants the reader to take, but is sometimes confusing if one considers the supposedly broad audience that the book is targeting. Saying that the “photosphere of the Sun is nowhere near as interesting as the surface of a planet” may be taken as a joke in a lecture to a specific group of students, but, to my opinion, is a strange statement to be found in a book targeting students taking courses in planetary science across a wide range of disciplines, researchers, and many keen amateur astronomers.

At the very beginning of the first chapter, it is said that all the planets that have been discovered outside our Solar System are giant planets. Despite being printed for the first time in 2009, this statement is out of date. One cannot blame the author for this fact, as he himself emphasises in the preface that “planetary science is such a dynamic area of research that any textbook gets out of date very quickly”. This is an inevitable issue, and does not mean of course that the rest of the book is wrong. Actually, the introduction on the eight planets of our System is very nicely written, and in a couple of sentences, the author summarises in simple terms what we know about these planets and how we got to know that.

Surprisingly, there is no mention of moons or satellites in the whole table of contents. At first glance this looks like an understatement of their relevance to the subject, as they play a major role in the evolution of planetary systems and could even harbour life. The words ‘moon’ and ‘satellite’ do not appear either in the index at the end of the book. They are, however, mentioned briefly in some sections of the book. Although the level of mathematics needed is quite simple, the author assumes that the reader is already familiar with some important physical laws such as, say, the Stefan-Boltzmann law. Unfortunately this is not the case of most first-year undergraduates. They would then have the choice between carrying on with their study of the book, relying on the explanations given in the text without worrying about the equations, or using another textbook giving more background. On the other hand, most readers are thought not to remember Snell’s laws. It looks as if Eales had a varying notion of what the reader’s background is. Overall, it is best if the student reader already has some astronomy and astrophysics background, but it should be possible for a first-year undergraduate to follow the discussion throughout the book.

The exercises at the end of chapters and the recommended additional resources are well-chosen, interesting and useful - although only short solutions (no detailed, fully-worked answers) are given.

Practising Science Communication in the Information Age: theorising professional practices

Subject area
Education, Science Communication

Description
This book supports the teaching and learning of contemporary science communication through core readings by drawing on current research in the field, and facilitating a research - teaching synergy

Authors
Richard Holliman, Jeff Thomas, Sam Smidt, Eileen Scanlon, and Elizabeth Whitelegg (Editors)

Publishers/Suppliers
Oxford University Press <ukcatalogue.oup.com/category/academic.do>

Date/Edition
2008

ISBN
978-0-19-955267-2 (Paperback)

Level
Undergraduate, research

Price
£19.99

Kieran F Lim (林百君)
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Australia
November 2009

Practising Science Communication in the Information Age is an informative and worthwhile book. The book and its companion volume[1,2], have grown out of an Open University course entitled *Communicating Science*, which is offered at the Masters or Postgraduate Diploma level.

Summary Review

range: * poor to ***** good

Academic content	*****
Usefulness to student	****
Usefulness to teacher	****
Meets objectives	*****
Accuracy	*****

The first section 'Communicating post-academic science' focuses on the different types and functions of science communication. Scientists form a community, defined by their interactions and communication with each other. Scientists also need to communicate the significance of their work to the general public and to government: the citizenry needs to be reassured that the work of scientists is meaningful and worthy of continued public funding. Chapter 3 discusses the role and ethics of patents.

The second section 'Developing trends in scientists' communicating' first examines how a challenge for modern science is the communication across and between numerous specialised disciplines and sub-disciples. The use of online media, such as open-access journals, blogs, and wikis, are discussed using the physics discipline as a case study.

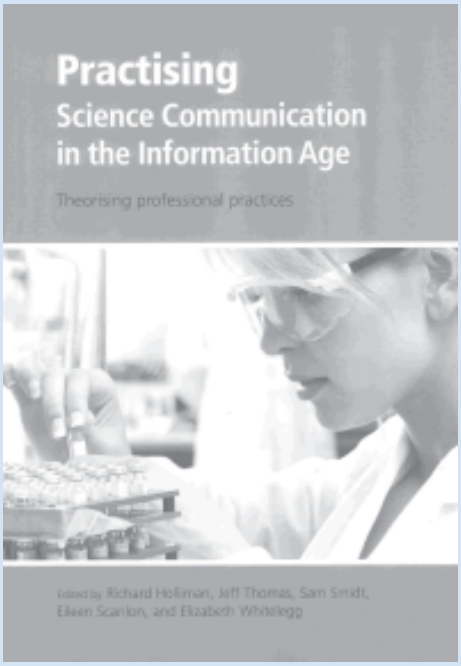
Section 3 'Accessing contemporary science' discusses how access to the scientific literature shapes the practice of science. Electronic journals, web sites, blogs and online audio-visual resources not only increases the rapidity and extent of interactions between scientists and non-scientists, but also enables the dissemination of information that was not previously possible. Disadvantages of these new media include lack of a guaranteed permanent archive of the information, and the ongoing cost of storage, dissemination, access and open-access.

The issues of quality assurance and control are developed in Section 4 'Consensus and controversy', with a chapter on peer review and a chapter on the role of scientists in public debate and informed discussion on issues such as genetically modified (GM) crops. It is suggested that in the not-too-distant future, the ability for *getting their message across* may be just as important for scientists, as the ability to work at the laboratory bench.

Section 5 'Popularising science' deals with the role of non-fiction books in the information age, science communication in fiction, and the use of radio and other audio media, such as podcasting. This is not to say that media such as movies and television documentaries are unimportant, but rather that the authors and editors have chosen three particular contents to illustrate the role of non-fiction books, novels and audio media in engaging the general public, reflecting and influencing how scientists think and work, recruiting future scientists, and expanding the scope of science communication.

In the final section 'Practising public engagement' the book shows that even in the modern information age, there are important roles for science centres (science *museums*) and discussion groups. *Our Dynamic Earth* in Edinburgh and *Café Scientifique* are presented as case studies. Both of these different *spaces* seek to engage and educate the public.

Practising Science Communication in the Information Age: theorising professional practices



From the publisher...

Practising Science Communication in the Information Age
Theorising Professional Practices
Edited by Richard Holliman, Jeff Thomas, Sam Smidt, Eileen Scanlon, and Elizabeth Whitelegg

Practising science communication in the information age is a collection of newly-commissioned chapters by leading scholars and practitioners of science communication. It considers how scientists communicate with each other as part of their professional practice, critically evaluating how this forms the basis of the documenting of scientific knowledge, and investigating how open access publication and open review are influencing current practices. It also explores how science communication can play a crucial role when science is disputed, investigating the role of expertise in the formation of scientific controversy and consensus.

978-0-19-955267-2 264pp 2008 £19.99

Practising Science Communication in the Information Age is better suited as a reader or reference book rather than a textbook *per se*. Each of the 14 chapters has citations to recent (mostly post-2000) literature, suggestions for further reading, and listings of useful websites. The book rated lower in the areas of usefulness to students and usefulness to teachers because there are no critical thinking, reflection or revision questions.

Finally, the book's content is based firmly in a UK context, with examples from the USA and some from Europe. There is little or no discussion of whether science communication in the information age is different or similar in the non-English-speaking world such as Asia, Africa, Central and South Americas. Despite this shortcoming, this antipodean reviewer still found that the book gave much insight into the theory and practice of modern science communication.

The book is intended for science communication students. Many students and teachers in the sciences may find the level at which this book is written, to be challenging and outside their comfort zone of understanding. Nevertheless, it is definitely worth reading to learn about the philosophy and models that lie behind science communication.

References

1. R Holliman, E Whitelegg, E Scanlon, S Smidt and J Thomas (ed.), *Investigating Science Communication in the Information Age: Implications for public engagement and popular media,* Oxford University Press, Oxford, (2009).
2. K Moss, *Reviews,* **10**, 34-35 (2009).

Student Projects in Environmental Science

Subject area
Environmental Sciences, Education

Description
This text guides students through their research project from the initial stages of choosing a suitable topic, of conducting the relevant experiments and interpreting the data, through to effective presentation of the results

Authors
Stuart Harrad, Lesley Batty, Miriam Diamond and George Arhonditis

Publishers/Suppliers
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2008

ISBN
978-0-470-84566-0

Level
Undergraduate, research

Price
£19.99

Summary Review	
range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

When this book arrived for review I realised that I had completely misinterpreted the title. What I was rather vaguely expecting was a series of examples or suggestions about what kind of projects that environmental science students might undertake, perhaps with some examples. That is not what I found. In fact this book is far better than that and in my view should be compulsory reading for all environmental sciences project students (and their supervisors). Nor should it be entirely restricted to the environmental sciences. The authors are experienced researchers and have found a very useful way of passing on that experience. In fact, many of the basic tenets expressed are highly relevant to any student project work.

So what is this book about? Well, in essence it is a guide to how to succeed in a research project. It explains how to create and plan a project that stands a chance of success, how to manage (and be managed by) your supervisor and many of the basic principles of scientific research and scientific reporting. It contains advice that will bring delighted recognition to harassed academics. If I may quote verbatim from a small pearl from the opening chapter “Although some academics do spend the majority of their time involved in teaching, for many others this aspect of their work is a minor (but important) component. One thing that many undergraduate students undertaking their research project come to realise quickly is that academics do not ‘have the summer off’. This is because there are postgraduate students and postdoctoral researchers to supervise, research papers and applications for funding for new research projects to write, postgraduate teaching to be carried out, ‘resit’ examinations to be set, invigilate and mark, new course material to write, old course material to review and update etc etc”. Ain’t that the truth!!

The book is structured directly along the direction of a typical research project from start to finish. So chapter one is about devising and setting up a project and obtaining the best from your supervisor. It has the essential goal of helping a student to devise a project that is actually do-able. Subsequent chapters deal with gathering data, testing hypotheses, spotting relationships, making sense of things through mathematical modelling and finally presenting the work in a report. There are very valuable pieces of advice about data quality control, choice of appropriate statistical tools (both parametric and non-parametric methods are described), distinguishing between coincidence and causality, identifying differences, spotting relationships modelling approaches and so on. All the way through there are practical examples of the use of the techniques described and these are very well done. They follow the step by step thought processes involved in reaching conclusions, which is really helpful.

The coverage is not always in sufficient depth to carry the student right through to completion; if it did that it would be twice the size and probably half the value. Instead, through the relatively simple approach adopted readers should be able to identify appropriate (and inappropriate) ways of proceeding. If there is perhaps a weaker area in the book it is to my mind in the modelling section. It does a good job of describing the types of

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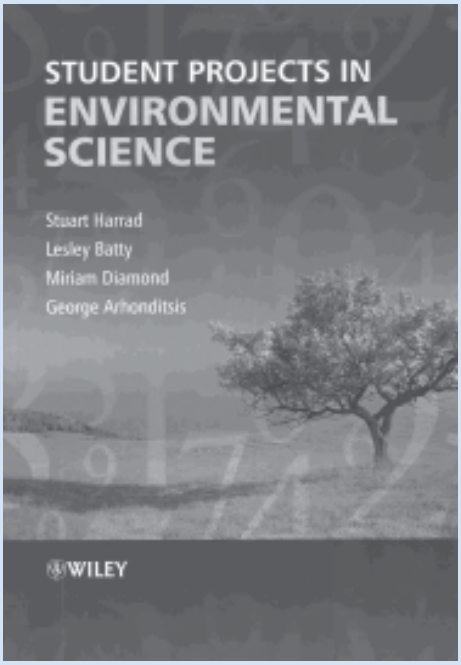
October 2009

Student Projects in Environmental Science



From the publisher...

Student Projects in Environmental Science

By Stuart Harrad, Lesley Batty, Miriam Diamond, George Arhonditsis

Research projects are among the core components of many undergraduate and Masters degrees within environmental science and physical geography, and students increasingly undertake courses in quantitative research methodology before starting on their own assignment. This one-stop-shop text guides students through their research project from the initial stages of choosing a suitable topic, of conducting the relevant experiments and interpreting the data, through to effective presentation of the results.

978-0-470-84566-0 174pp 2008 £19.99

models and gives examples of model output but there is a gap in the middle where a student might want to see how a model is actually constructed in a computer program. In this instance, students who know nothing about modelling don't have enough to get started and the chapter is better suited to those who have a bit of background maths/computing experience and can actually utilise the advice given.

Despite this minor caveat this is an excellent book that can be thoroughly recommended to any student embarking on a practical project in the sciences. It has an admirably light touch, is very readable, amusing in places and packed with many sensible tips from experienced practitioners. I have already asked for a number of copies to be purchased for our own library where I expect them to be much in demand.

Superconductivity: a very short introduction

Subject area
Physical Sciences

Description
An overview for the general reader

Authors
Stephen Blundell

Publishers/Suppliers
Oxford University Press
<ukcatalogue.oup.com/category/academic.do>

Date/Edition
2009/1st edition

ISBN
978-0-19-954090-7

Level
General reader

Price
£7.99

Summary Review

range: * poor to ***** good	
Academic content	****
Usefulness to student	****
Usefulness to teacher	****
Meets objectives	*****
Accuracy	*****

This book is one of the latest in OUP's *Very Short Introduction* series. These the OUP claim "are the perfect introduction to subjects you previously knew nothing about" and are "extremely popular with general readers, as well as undergraduate students and their lecturers". This volume then is no text book but is aimed at the popular science market and has no equations, possibly remembering the maxim that each equation lowers your potential sales.

Chapter one crisply introduces superconductivity defining how it differs from out normal understanding of the word and mentioning a few of its most important uses in modern day life such as MRI scanners.

In Chapter two a historical perspective is given to Onnes work in liquefying gases. We start, maybe not surprisingly, with Michael Faraday who from 1823 worked at liquefying gases, such as chlorine and carbon dioxide. The story carries on apace with other great names in 19th century Science popping up and the importance of their research being explained. Until 1911, and Onnes achieved the ultimate goal of liquefying helium.

Chapter three explains the further work in his Leiden Lab that led to the Superconductivity, and that it was a complete surprise. Onnes was trying to experimentally deduce which theory, if any, of electrical conduction was correct at low temperatures, Blundell makes the important point that Onnes didn't know if the resistance fell to zero or only such a low value that he couldn't measure it with the instruments he had, which is often overlooked in the telling.

The middle chapters explore the developments in superconductivity up to the 1980s, Introducing the theoretical steps that were made in understanding the behaviour, but also highlighting that no theory has ever predicted if a material would superconduct, but rather solid state chemists have used empirical insights to discover new superconductors. John Bardeen the B of BCS theory is a hero for the author and rightly gets a lot of attention but the work by the Soviet group led by Lev Landau is discussed too.

The book then explores the developments in superconductors in the last twenty years, starting with Bednorz and Muller and going through the recent work on MgB_2 and pnictides. Finally applications of superconductors are discussed.

This is book is not just a chronological list of advances though; the author conveys the personalities of the people involved; the modest John Bardeen and his egotistical collaborator Shockley. The personality clash that kept Dewar and Ramsey, two great Scottish Scientists, from collaborating even though their London labs were only about a mile apart. It also goes off on short tangents, exploring interesting points, such as how scientific work is published.

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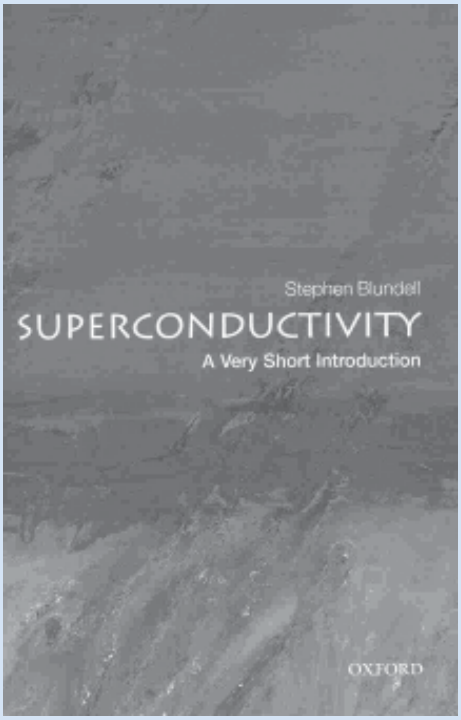
October 2009

Superconductivity: a very short introduction



From the publisher...

Superconductivity: A Very Short Introduction

By Stephen J. Blundell

Superconductivity is one of the most exciting areas of research in physics today. Outlining the history of its discovery, and the race to understand its many mysterious and counter-intuitive phenomena, this Very Short Introduction explains in accessible terms the theories that have been developed, and how they have influenced other areas of science, including the Higgs boson of particle physics and ideas about the early Universe. It is an engaging and informative account of a fascinating scientific detective story, and an intelligible insight into some deep and beautiful ideas of physics.

978-0-19-954090-7 168pp 2009 £7.99

For a book that covers so much ground I could spot only one minor factual error, Harry Kroto was a professor at Sussex not Surrey University. The author explains the isotope effect on lattice vibrations and their link to T_c, which provided strong experimental evidence for BCS theory. It would have been good if he had also mentioned that T_cs for high temperature superconductors are not affected by the isotope effect, indicating that BCS theory cannot explain the superconductivity in these materials.

Overall this book achieves the aim of the *Very Short Introduction* series. I would recommend it to any lecturer who is going to teach a course in superconductivity, for material that will help enliven lectures. I would also recommend it to undergraduates, both physics and chemistry, as they will get an excellent short readable introduction to the field.

The e-Revolution and Post-Compulsory Education: using e-business models to deliver quality education

Subject area
Education Management

Description
Boys, Ford and their fellow contributors offer a range of perspectives in exploring how e-business approaches to information and communication technology and the provision of services can inform current and future practices in post-compulsory education. This book does not, however, propose that the sector should operate more like a commercial business; rather it advises that, in a highly competitive educational marketplace, institutions need to react to and embrace new technologies to provide rich and competitive learning experiences for the students of tomorrow

Authors
Jos Boys and Peter Ford (eds)

Publishers/Suppliers
Routledge (Taylor & Francis Group) <www.routledge.com>

Date/Edition
2008

ISBN
978-0-415-41987-1

Level
Senior managers, leaders, managers and heads of e-learning in higher and further education

Price
£24.99

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Clifton Lane
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November 2009

Summary Review

range: * poor to ***** good	
Academic content	****
Usefulness to student	***
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

The book's primary audience are the people in positions to make these judgments and decisions: the leaders, managers and heads of e-learning in higher and further education and so this book may not have universal appeal. On the other hand, if you feel that your organisation's systems (admissions, student support, the VLE, the library, expenses claims, purchasing or timetabling etc) could be improved then the change strategies discussed here can offer a way forward.

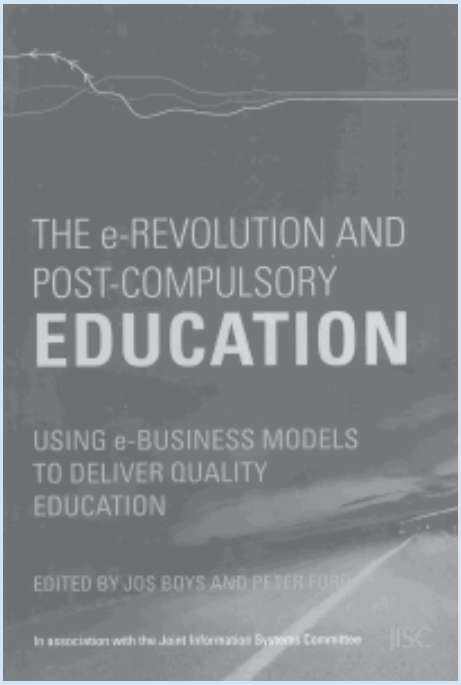
This is not a book about e-learning practice in the classroom. Instead in discussing the impact of new technology on the whole of institutional practice in the post compulsory sector, we are asked to consider whether we really understand the implications of the new e-technologies for our core business in the future?

To provide a framework for these discussions a business model for successful use of ICT known as MIT 90s is used. This model defines five different phases/levels for the use of technologies and their relative impact on customer focus, organisational integration and systems rationalisation. The phases move from phase 1 - localised adoption by individual and small groups (evolution) through transformation and onto to innovation and revolution at phase 5 - involving organisation-wide business process redesign. [Whilst this model was developed in the early 1990s at MIT it appears to be still be quite useful and relevant due to its generic, descriptive nature and the fact that it does not promote the implementation of any specific ICT architecture].

The book's nine chapters explore how e-business is redefining relationships between enterprises and their users and its implications for e-learning; discuss how to improve administrative efficiency, implement faster access and response to information, enhance skills and knowledge development, and improve the student experience. The book does discuss relevant business models, exemplars and case studies of what an e-institution for education might look like. Examples cover a good range of situations and institutions – from developing e-learning for a satellite university campus in China to FE college portals in UK.

Critically evaluating what can be learnt from e-business – in particular concerning the relationships institutions have with stakeholders and partners - it asks are our students 'customers' or 'members'? I like the idea of students as 'members' as membership implies longer term relationships with, and loyalty to, an organisation. Does this then have consequences for the sort of systems we use to relate to our 'members'. Commercial enterprises - such as Amazon - are using the evolving features of internet services to further their customer relationships, which raises important questions about educational services and the developing marketplace - do we want to be 24/7 deliverers of education with fresh students enrolling every week onto programmes? How will we compete with commercial educational providers? Should we try? What sort of business is post-compulsory education?

The e-Revolution and Post-Compulsory Education: using e-business models to deliver quality education



From the publisher...

The e-Revolution and Post-Compulsory Education
Using e-Business Models to Deliver Quality Education
Edited by Jos Boys, Peter Ford

Moving debates about ICT and higher education beyond a simple focus on e-learning, this book takes into consideration the provision of post-secondary education as a whole.
[Discusses] what is meant by e-business, why e-business approaches are relevant to universities and colleges and the key issues this raises for post-secondary education.

978-0-415-41987-1 176pp 2008 £24.99

Whilst technological innovation is examined it is set in the context of how such developments can be integrated within an institution. Do we operate localised models of ICT systems (silos of individual bits of IT all designed to work as stand-alone) or are all the e-systems we use capable of exchanging information with each other so that managers have all the data they need to make informed decisions? Later chapters take the theme 'Getting from here to there' and suggest that to redefine our engagement with e-systems, institutions need to adopt effective change management strategies that involve all user groups in consultation and to develop a shared vision. The contributors, fortunately, reject the idea of a single ICT solution for every institution ie 'one size fits all'; instead they champion the need for each institution to take a holistic approach to *all* of its e-services, whether academic or administrative. It also recommends that organisations have a senior manager who fully understands the potential of modern ICT. Of course, given the scale of investment in institution wide IT systems, such revolutionary changes and planning must be accompanied by thorough risk assessment and cost-benefit analyses. This is may involve re-designing existing organisational frameworks, applying techniques for overcoming barriers to change to successfully implement the types of technologies required for an e-integrated educational provision. The challenges discussed in this book face us all and the authors certainly led me to reflect on how far my institution has travelled on this road.

Overall the book is written in a readable style with a minimum of jargon and *IT speak* and as such is accessible to a wide audience. The contributors offer a good range of perspectives from the academic, and managerial to commercial expertise from companies such as Cisco and IBM. There are some interesting business models presented as tools to evaluate developments and these are transferable beyond the remit of the book which was an added bonus. One minor criticism is that references appear to go up to 2006 only – in this sector 2-3 years is a long time!

Vibrations and Waves

Subject area
Physics, Engineering

Description
An undergraduate text book on vibrations and waves aimed at first year students

Authors
George C King

Publishers/Suppliers
John Wiley and Sons
<eu.wiley.com/WileyCDA/Section/index.html>

Date/Edition
2009

ISBN
978-0-470-01189-8

Level
Undergraduate

Price
£29.95

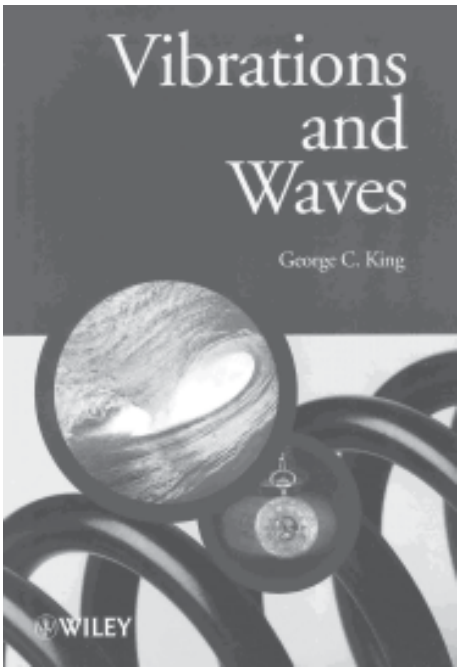
Nigel Mason
Department of Physics and Astronomy
The Open University
Walton Hall
Milton Keynes MK7 6AA
November 2009

Summary Review

range: * poor to ***** good	
Academic content	*****
Usefulness to student	*****
Usefulness to teacher	*****
Meets objectives	*****
Accuracy	*****

This excellent book provides an introductory text on the physics of vibrations and wave motion. It is a new volume in the well known, and widely used, *Manchester Physics* series and is based on a lecture course that the author has presented for many years to first year physics undergraduates at Manchester University. Accordingly the book is organised in a logical manner, ideal for presentation as a series of lectures.

The book beings with a description of Simple Harmonic Motion (SHM) before discussing damped harmonic motion in Chapter 2; Forced oscillations are discussed in Chapter 3 and coupled oscillators in Chapter 4. This last chapter acts as a link between discussion of SHM and the later part of the book that describes wave motion in the form of travelling waves (Chapter 5); Standing waves Chapter 6; interference and diffraction (Chapter 7) and dispersion of waves (Chapter 8).



The material is presented in a well reasoned way and the diagrams are very clear. The mathematical content is based on the knowledge to be expected from a recent A-level student but where necessary (eg in use of complex number) short tutorials are provided. Each chapter contains many examples drawn from the natural world as well as the laboratory (eg in electrical circuits) which places the necessary mathematical description in a physical and more tangible manner. Each chapter has several worked examples and concludes with a series of problems (for which solutions are provided at the end of the book). Many of these are clearly questions that have been used in tutorials, examinations and/or problem classes and are an excellent source of material for any lecturer seeking to set questions (with minor changes of course!).

In conclusion this is an excellent text book which is perfectly pitched at the first year undergraduates in traditional physics course but it may also be used by engineering students and other scientists/technology based undergraduates needing instruction in the fundamentals of wave motion. It is a valuable addition to the *Manchester Physics* series and I would recommend it to lecturers as a course book.

The Physical Sciences Centre is one of the 24 Subject Centres in the Subject Network of the Higher Education Academy, a UK-wide initiative supported by the four Higher Education Funding Councils

www.heacademy.ac.uk/physsci

Reviewed in this issue...

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