

EDITION

GELINAS • SUTTON

# ACCOUNTING INFORMATION SYSTEMS

FIFTH EDITION

# ACCOUNTING INFORMATION SYSTEMS

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## PREFACE

### ● TO THE AIS STUDENT

First, we thank you and your instructor for choosing our text for your study of Accounting Information Systems. We are confident that you will be happy with your choice. We are equally confident that your AIS studies will give you a competitive edge upon graduation; such has been true with our students. Our text is structured to support the way we teach the AIS course at Bentley College and Oklahoma State University, where the course is required for all accounting majors and is a prerequisite for the principles of auditing course. However, the text's organization is flexible enough to be used in several alternative course designs.

It is our firm belief that the AIS course is the catalyst for the accounting and business courses you have taken and will take. Unquestionably, information technology is transforming the accounting profession, and the lines between accountants and information technology (IT) professionals are becoming increasingly blurred. The approach we have used in this book is consistent with the earlier editions as we focus on the integration of skills related to (1) designing and using accounting information systems, (2) improving communication skills, (3) using information in decision making, and (4) designing and implementing control systems in advanced technology environments. This approach has served us well over time as the text has found its way into numerous classrooms internationally and on the office shelves of many practitioners.

The varied information that is brought together through the AIS course can be quite challenging. Unlike most texts you have probably used, we do not feel the need to make the learning more laborious through a formal, stilted writing style, nor through an unnecessarily heavy use of technical jargon. Rather, we use a relaxed style, based on our belief that your learning can be enhanced through the



use of a text that is easy to read and understand, while still providing you with the depth of coverage needed to prepare you for success in the future.

Figure P.1 (p. v) provides an overview of how we have organized the information in the text. Let's take a look at each of these features briefly.

## An Accountant's Focus

We assume that many of our readers are planning to have careers in accounting. Therefore, we approach AIS from the perspective of the career roles that you, the accountant, will play. In Chapter 1, we discuss these roles and how they tie into the various components of this book. Then we move on in Chapter 2 to talk about the importance of information to decision making and how information systems can be used to provide a strategic advantage for an organization. We conclude this section with an overview of the key documentation tools used by both accountants and other information systems professionals to design and/or understand the workings of information systems. Let's take a closer look at these tools.

Take a few minutes to study Figures P.2a and P.2b (pp. vi and vii), which present two different views of a hypothetical college course registration procedure. Which view—the systems flowchart or the data flow diagram (DFD)—paints the clearer picture? We won't debate the answer here; each view has different advantages depending on what you are trying to analyze. In Chapter 3, we first teach you how to read the diagrams in detail before teaching you to draw them, and we introduce you to other documentation tools as well. One advantage of the DFD is that it allows us to examine the essence of “what” a system does without getting bogged down in the details of “who” does it or “how” it is done. For example, the DFD (Figure P.2b) doesn't force us to know that the registration system is computerized. Because the DFD allows us to concentrate on a system's *essence*—on its functional logic—we use this tool extensively throughout the text.

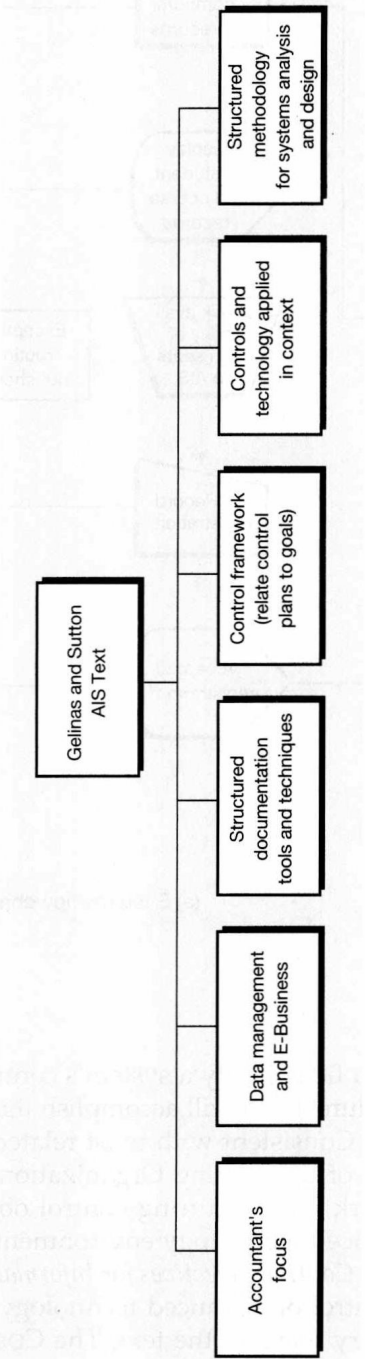
## Data Management and E-Business

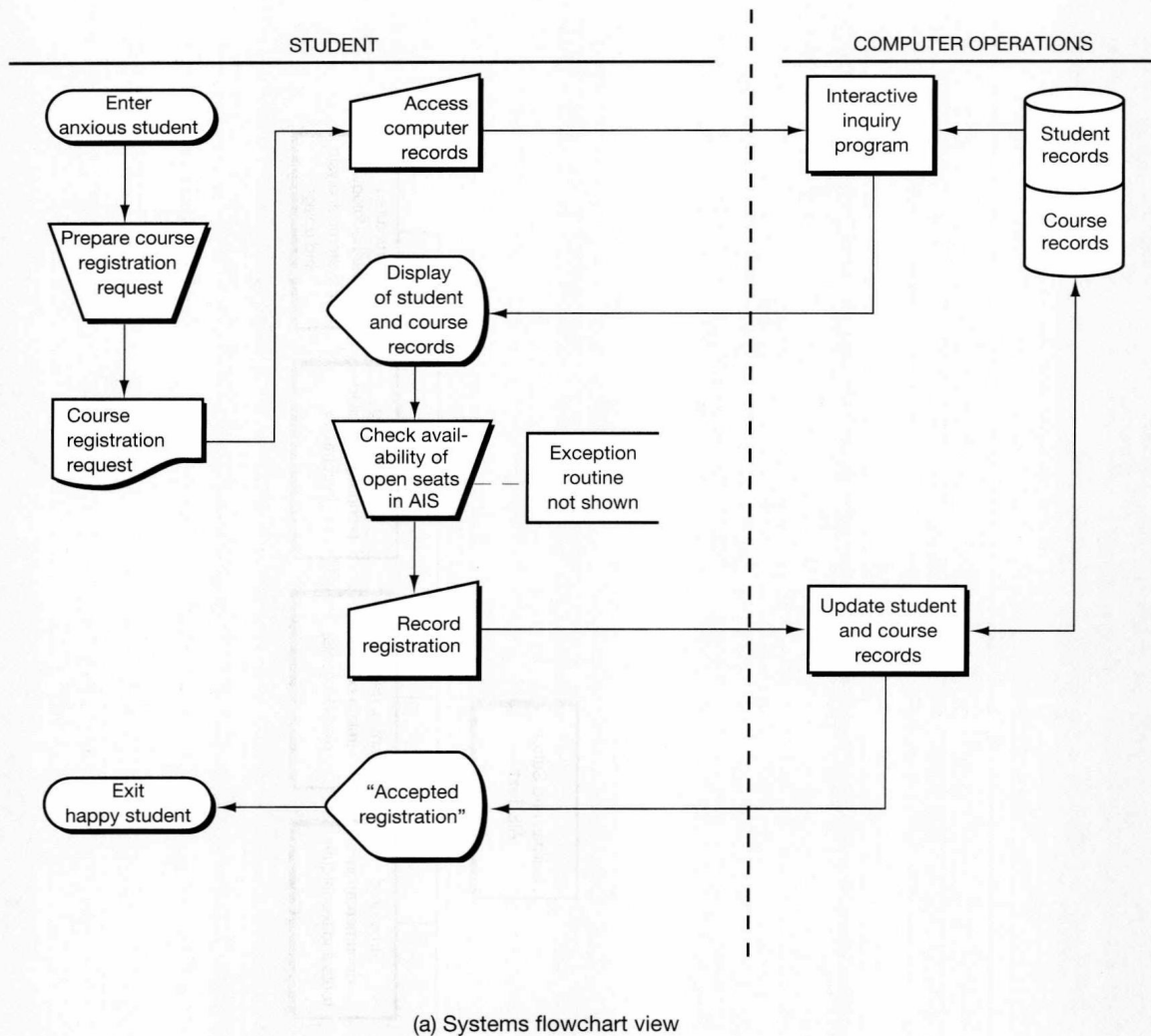
If we tried to tell you about a great new revolution in accounting systems, driven by database management systems that are increasingly operating in electronic business (E-Business) environments, you might laugh and tell us that the revolution is not new. Indeed, both of these technologies, and particularly E-Business, have received significant publicity in the popular press. What is very significant in the context of the AIS course is that these two technologies are radically changing the accounting environments and pose major challenges for new accounting professionals. In Chapters 4–6, we try to demystify these technologies and bring them down to a level where you are comfortable in discussing such systems and have a solid understanding of the control issues surrounding the use of advanced technologies.

## Internal Control: The Control Framework

We think it is senseless to have AIS students memorize long lists of control procedures unless they can relate those procedures to the *goals* that the procedures are intended to achieve. Thus, an essential component of the text's design is the *control framework*, introduced in Chapter 9. We then use the framework to teach controls in Chapters 9 through 14. Based on an approach used by PricewaterhouseCoopers, one of the Big Five public accounting firms, the control framework requires that

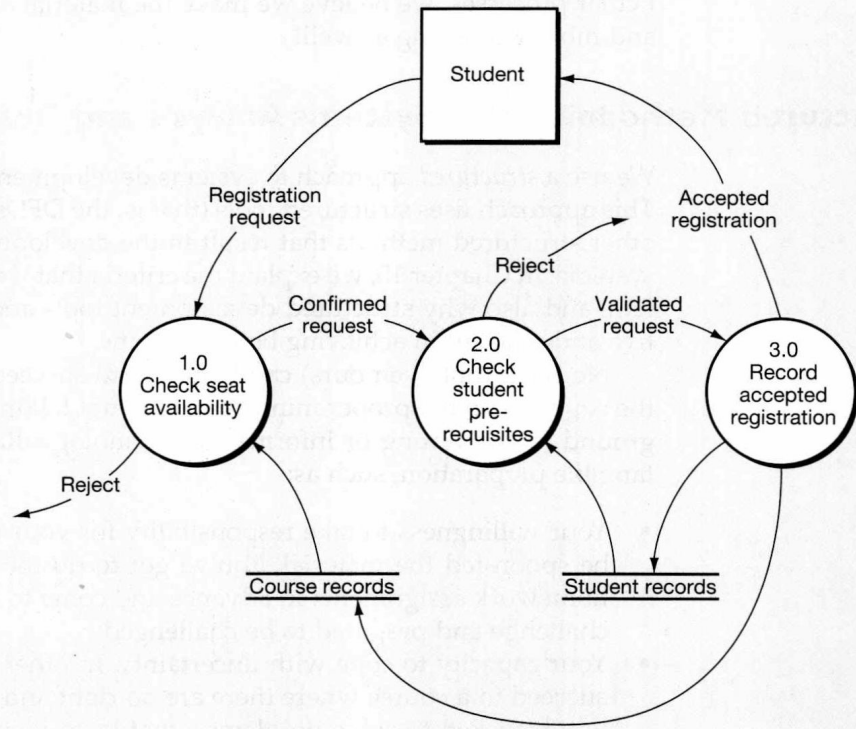
**Figure P.1** Distinguishing Features of This Text



**Figure P.2a** Two Different Views of Student Registration

you first specify a system's control goals and then recommend control *plans* (procedures) that will accomplish those specific goals.

Consistent with most related texts, we provide an overview of the Committee of Sponsoring Organizations of the Treadway Commission (COSO) framework for structuring control objectives. However, COSO has limitations in advanced technology environments. As such, in Chapter 8 we use our expertise in the *Control Objectives for Information and Related Technology* (COBIT) framework for control of advanced technology-based business information systems as the primary focus in the text. The COBIT framework, recently revised by the Information Systems Audit and Control Association (ISACA, 2000), expands upon COSO to specifically address the implications of technology on accounting control systems.

**Figure P.2b** Two Different Views of Student Registration (*continued*)

(b) Data flow diagram view

## Business Processes: Controls Applied in Context

In the business process chapters, we explore the nature, functions, purpose, control goals, and control plans for a business's *operations* process and *information* process. In this regard, we think our approach is superior to approaches in many AIS books, in which the operations process is virtually ignored. After all, budding accountants must broaden their horizons to think how they can further the objectives of an organization, beyond merely assisting in the preparation of financial reports. For this reason, we have a separate chapter (Chapter 10) on the order/entry sales (OE/S) process. Because this process does not interface directly with the general ledger, many texts incorporate OE/S in the same chapter with billing/accounts receivable/cash receipts. However, we believe that the work performed by the OE/S—namely, processing customer orders and managing and mining customer-related data—is so important to the organization's success—in many cases its very survival—that a separate chapter is warranted.

Chapters 10 through 14 cover business processes. In these chapters, we teach you to *apply* control *concepts* to particular processes. We do likewise with computer technology. Rather than talk about the various technologies in the abstract, we implement each process using a different technology. For instance, in Chapter 10, the order entry/sales process uses online technology with remote data entry. The billing and cash receipts processes in the billing/accounts receivable/cash re-



ceipts process in Chapter 12, on the other hand, employ a more traditional batch processing approach. By discussing controls and technology in the context of particular processes, we believe we make the material easier for you to understand; and more interesting as well!

## Structured Methodology for Systems Analysis and Design

We use a *structured* approach to systems development in Chapters 15 through 18. This approach uses structured tools (that is, the DFDs mentioned previously) and other structured methods that result in the development of “better” information systems. In Chapter 15, we explain the criteria that we use to define a “better” system, and also why structured development tools and techniques are more effective and efficient in achieving better systems.

No book (not even ours) can help you to succeed in AIS unless you come to the course with the proper mind-set. We’re not talking about your technical background in accounting or information technology. Rather, we’re referring to less tangible preparation, such as:

- Your willingness to take responsibility for your education. You can’t wait to be spoon-fed the material. You’ve got to do the required reading and other homework assignments in advance and come to class prepared—prepared to challenge and prepared to be challenged.
- Your capacity to cope with uncertainty. In other words, you must be able to succeed in a course where there are no right and wrong answers. In AIS, you will be asked to solve problems—that is, to identify what the problem is, to consider alternative solutions, to select a solution, and then to defend your choice.
- Your ability and willingness to accept change as the only real constant in life and to prepare yourself to deal with change in your career. Because technology is rapidly outdated, learning facts about the current state of affairs will pay dividends only in the short run. What’s important for your long-term success is that, at the university, you “learn how to learn,” and that you continue to learn for the rest of your life. AIS can help you to learn *how to learn*.

In summary, to you, the student, we wish you success in AIS. Enjoy your journey through this exciting and dynamic subject!

## SUMMARY OF CHANGES MADE IN THE FIFTH EDITION

Based on feedback we have received from adopters—and other reviewers—regarding the first four editions, combined with our own experience, we have made the following changes for the fifth edition:

**Three important AIS themes.** We have organized and enhanced the presentation of three topics that are very important to us and to adopters of this text: **enterprise resource planning (ERP) systems**, **E-Business**, and **internal control**. We’ve added icons in the margins of the text to indicate areas where these themes are discussed.

The use of *enterprise resource planning (ERP) systems* has increased rapidly in the last few years. The names of ERP vendors, such as SAP, J.D. Edwards, PeopleSoft, and Oracle, are quite familiar. ERP systems are introduced in Chapter 5

ERP

E-BUSINESS

CONTROLS

and then discussed throughout the remainder of the text. For example, in Chapter 10 we have added a flowchart to depict how the order entry/sales process would be implemented with an ERP system. Similar additions will be found in the other business process chapters. Also, examples of screens from ERP systems have been included throughout the text.

**E-Business** affects most of us every day. For example, we order goods over the Internet and correspond with our friends and family via e-mail transmitted over the Internet. E-Business is introduced in Chapter 6 and then discussions of E-Business are included throughout the text. For example, the technology used to implement the business processes in Chapters 10 through 14 emphasizes E-Business.

**Internal control**, a topic that has always been a subject of great interest to accountants, has received greater attention in the last few years as management has realized the importance of internal control to the effective governance of organizations and the IT that drives most organizations. Internal control is introduced in Chapter 7 and expanded upon in Chapters 8 and 9. Then, the controls from those chapters are applied in the business process chapters—Chapters 10 through 14—and in the analysis and design chapters—Chapters 15 through 18.

**Technology.** As in the fourth edition, we present technology and other current topics in sidebars, which are typeset to make them stand out from the text. Since the unique design allows you to easily locate the sidebars within each chapter, you can read about a particular technology without having to read the entire chapter. There are three types of sidebars:

1. *Technology Summaries* define and discuss a major topic. For example, Technology Summary 5.1 describes enterprise resource planning systems (ERPs) and their impact on organizational information systems.
2. *Technology Applications* present short examples—taken from actual practice—of using a technology. For example, Technology Application 2.1 reports on how PricewaterhouseCoopers uses *TeamMate* to automate the audit process.
3. *Technology Excerpts* contain article reprints. For example, Technology Excerpt 17.2 contains excerpts from several articles from *Journal of Accountancy* that discuss how to select the right accounting software to meet an organization's needs.

In the fifth edition, we have updated the technology discussions to reflect current developments on the technology front. Among the specific topics that have received expanded and updated coverage are E-Business, enterprise resource planning (ERP) systems, application service providers (ASPs), knowledge management, intelligent agents, intelligent systems, electronic data interchange (EDI), digital image processing, computer viruses and computer hacking, database marketing systems, data warehousing/mining, data marts, vendor managed inventory, e-procurement, just-in-time systems, object-oriented systems, and contingency planning. In addition, customer relationship management (CRM) systems, web-based business reporting (XBRL), distributed denial of service attacks, and capability maturity model (CMM) have been added as topics.

**Documentation tools.** Chapter 3 continues to include a comprehensive coverage of how to read and prepare data flow diagrams (DFDs) and systems flowcharts. The chapter also describes how to read entity-relationship (E-R) diagrams (the drawing of E-R diagrams is still covered in Chapter 5). The procedures for drawing DFDs and flowcharts has, however, been streamlined to reduce the number of tables required to prepare this documentation.

**Controls.** Chapters 7–9 (Part 3) continue to present a centralized source of information on internal control. Chapter 7 introduces internal control, including such frameworks as COSO and COBIT. Chapter 8 presents pervasive and general controls, including control against E-Business exposures such as denial of service attacks. Chapter 9 introduces the control framework and discusses technology-related controls. The latter presentation has been updated to reflect current data entry techniques. The controls have been grouped into three new categories: offline data entry, online data entry, and batch data processing.

**Enhanced coverage of business processes.** Part 4 (Chapters 10–14) has been modified to emphasize business processes and the implementation of those processes with ERP systems. The increased emphasis on supporting management decision making is consistent with a broader perspective on the overall business process. Additionally, the impact of emerging E-Business models is considered within the context of each of the business processes.

**Enhanced analysis and design coverage.** Part 5 (Chapters 15–18) on systems analysis and design has been further condensed in the fifth edition. We use the same structured approaches as the earlier editions, but we have moved the ACME Case Study to the CD that accompanies the text. Using an E-Business example has enhanced the discussion of business process reengineering. All four chapters are more focused on the analysis, design, and implementation of an ERP system.

**Other changes.** The glossary, end-of-chapter questions and problems, and instructor ancillaries have been modified to reflect additions, deletions, or other changes in chapter coverage.



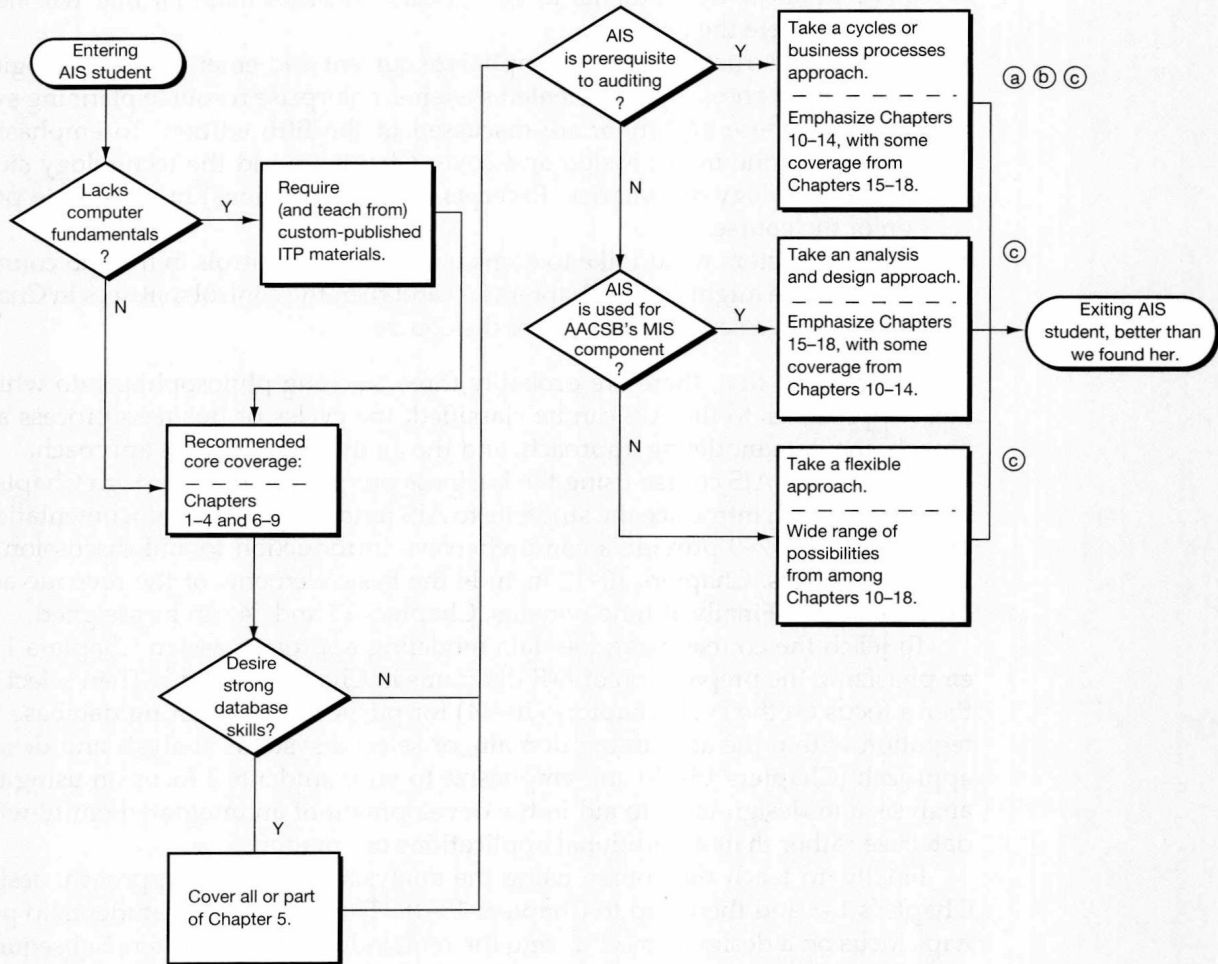
## TO THE AIS INSTRUCTOR

We believe we have produced a text that gives you maximum flexibility to accomplish *your* objectives. Figure P.3 (p. xi) suggests different paths through the text. Over the years, we've experimented with most of them in our search for the "one right answer."

Choosing one of these paths depends somewhat on your teaching philosophy, the background that your students possess when they take the AIS course, the place that your AIS course holds in your curriculum, and your own learning objectives for the course.

These factors would suggest chapter coverage as follows:

- If the AIS course is required and is a prerequisite to the auditing course, you may want to include the internal control chapters (Chapters 7–9) and the basic elements of the revenue and expense cycles (Chapters 10–12) in your course.
- If you prefer a more managerial accounting emphasis, Chapter 13 embraces several contemporary product costing and manufacturing issues within a systems context. The discussion of ERP systems in such environments further enriches the context.
- If your students do not have adequate background in computers and MIS, you may want to supplement the text with your own materials or with selected chapters from other Thomson Learning texts. Either can be custom-published with all or part of this text. For information on custom publishing, contact your South-Western/Thomson Learning sales representative or the Thomson Learning Custom Publishing at <http://custom.thomsonlearning.com/>.

**Figure P.3** Alternative Routes Through the Text**NOTES:**

- (a) Some might prefer to start with Chapter 14 (General Ledger and Business Reporting) instead of Chapter 10 (Order Entry/Sales).
- (b) Covering all of the business process chapters (10-14) might be overkill. They can be covered selectively (e.g., cover all of the revenue cycle: Chapters 10, 11, 14, and selected others).
- (c) Interspersing analysis and design chapters (15-18) with business process chapters (10-14) can be effective. A sequencing that we have used successfully is 10, 11, 15, 16, and two more business process chapters, 17 and 18.

- If you take a survey approach to the introductory material, such as focusing on the reading of systems documentation rather than the preparation, you can cover more chapters in a semester than if you spend time teaching students to prepare flowcharts, data flow diagrams, and entity-relationship diagrams.
- If your curriculum has an advanced AIS course, certain material may be covered in that course. For example, your advanced course may emphasize data modeling (the latter part of Chapter 4 and Chapter 5) and/or systems analysis and design (Chapters 15-18).

- If you assign a class project that engages the student in aspects of systems analysis and design, you can assign Chapters 15–18 anytime after Chapter 3. This will allow the students to get an early start on material that will help them complete the project.
- Some AIS instructors want to emphasize current and emerging technologies, such as E-Business, object-oriented systems, enterprise resource planning systems, etc. These and more are discussed in the fifth edition. To emphasize technology, one might assign and cover Chapter 6 and the technology sidebars (Technology Summaries, Excerpts, and Applications) in a separate portion of the course.
- Some instructors would like to emphasize internal controls in the AIS course. To do so, one might cover Chapters 7–9 and then the control matrices in Chapters 10–12 in a separate portion of the course.

Having said that, there are probably three teaching philosophies into which most approaches to the AIS can be classified: the cycles or business process approach, the data modeling approach, and the analysis and design approach.

To teach the AIS course using the business process approach, assign Chapters 1–4 and 6, which introduce the students to AIS fundamentals and documentation. Then, Chapters 7–9 provide a comprehensive introduction to and discussion of internal controls. Chapters 10–12 include the basic elements of the revenue and expense cycles. Finally, if time remains, Chapters 13 and 14 can be assigned.

To teach the course using the data modeling approach, assign Chapters 1–5, emphasizing the preparation of E-R diagrams in Chapters 4 and 5. Then select either a focus on the cycle chapters (10–14) for purposes of exploring database integration within the accounting domain, or select a systems analysis and design approach (Chapters 15–18) and emphasize to your students a focus on using the analysis and design tools to aid in the development of an integrated entity-wide database rather than a traditional applications orientation.

Finally, to teach the course using the analysis and design approach, assign Chapters 1–3 and then skip to Chapters 15–18. This allows your students to perhaps focus on a design project during the remainder of the semester. Subsequent class time might focus on database and data communications-related issues in design (Chapters 4–6), internal control implications for systems design (Chapters 7–9), and/or fundamentals of accounting cycle processing (Chapters 10–12). If you are on a quarter system, you will probably choose one of these latter options; if you are on a semester system, you might choose two of the three.



## FEATURES OF THE TEXT AND SUPPLEMENTS

Our text includes the following features, all of which have been *class-tested*, to assist you in teaching AIS:

- Completely original (none from professional examinations) end-of-chapter discussion questions and problems that focus on the material covered in each corresponding chapter.
- Nine “mini-cases” at the end of Chapters 3, 10, 11, and 12. These system narratives also support problem requirements in some of the systems development chapters (Chapters 15 through 17). Additional mini-cases are included on the CD that accompanies the text.



- Nine capsule cases, adapted from actual real-world systems. We have made these system descriptions shorter than those in the mini-cases to allow you another vehicle for having your students acquire proficiency in documenting systems.
- The ongoing Acme Insurance Company case study that supplements the material in Chapters 15–18 is included on the CD that accompanies the text. The case study is based on an actual, major insurance company's systems development project.

Accompanying the text are an *Instructor's Resource Manual*, *Solutions Manual*, *Test Bank* (both printed and electronic), *PowerPoint Presentation*, and a dynamic new web site. In the *Instructor's Resource Manual*, we provide a sample term project that we have used successfully for several years in our courses. The project requires each team of students to make arrangements with a real-world organization to document and analyze a portion of that organization's accounting information system.

Visit South-Western's web site for this text at <http://gelinas.swcollege.com/>. Here you will find many new teaching and learning resources for both you and your students. Some of the items you'll find on the web site include the files for the *Instructor's Resource Manual*, the *Solutions Manual*, and the *PowerPoint Presentation*, as well as extra cases, case solutions, sample syllabi, and interactive quizzes and e-lectures for your students.

In our AIS courses, we have found that a combination of resource materials has allowed us a wide range of possibilities in terms of:

- Classroom delivery vehicles.
- Homework assignments (and rotating or altering those assignments over several semesters).
- Grade determination (e.g., over the years, we have used various combinations of team hand-in assignments, oral class presentations, chapter pre-quizzes, term-paper projects, analysis and design term projects, and class participation—in addition to examinations—to evaluate student performance).

We trust that you will find the teaching package both flexible and enjoyable to use. We earnestly solicit your feedback on both the text and the ancillaries, and appreciate knowing your criticisms and suggestions for improving the materials. In turn, we stand ready to respond to any questions or problems you may encounter. Please feel free to contact us through South-Western/Thomson Learning, directly through our academic institutions, or through our respective e-mail addresses: [ugelinas@bentley.edu](mailto:ugelinas@bentley.edu) and [suttons@okstate.edu](mailto:suttons@okstate.edu). We wish you success in AIS. Enjoy!

## ACKNOWLEDGMENTS

In closing, we must acknowledge that the pronoun “we” as used in this text extends far beyond the two authors. We owe so much to so many people who have helped us in this project that to name them all would leave little space for any AIS material. We want to thank the graduate assistants, secretaries, and work-study students who helped us all along the way. To the countless AIS students who have obliged us by letting us class-test our materials on them, we owe a special debt of gratitude.

We also are grateful for the invaluable assistance provided to us by Rebecca von Gillern and Marge Bril of South-Western/Thomson Learning. So too, we deeply appreciate the efforts of Sandy Thomson and her staff at Cover to Cover Publishing, Inc., in patiently guiding us through the gestation period involved in producing a printed work from our manuscript.

Thanks also go to the current users of the first four editions, several of whom have provided us with feedback. These include our colleagues at Bentley College: Professors John Beveridge, Jane Fedorowicz, Janis Gogan, Karen Osterheld, and Vincent Owhoso; at Oklahoma State University: Vicky Arnold, Pat Dorr, and Holli McCall; and our former colleagues at Bryant College (Saeed Roohani) and Texas Tech (Ron Daigle and David Malone). Other adopters and reviewers who deserve our thanks for providing helpful comments include Professors Mary Callahan Hill, Kennesaw State University; Stan Lewis, University of Southern Mississippi; Donald Saftner, University of Toledo; Christine Schalow and Curt Westbrook, California State University, San Bernardino; Jim Yardley, Virginia Tech; and Stewart Leech, University of Melbourne.

Finally, to our wives, to whom we dedicate this book, we thank you for your infinite patience throughout this project. Without your support and encouragement, this fifth edition would not have been possible.

*Ulric J. Gelinas, Jr.*  
*Steve G. Sutton*

*We dedicate this fifth edition to our wives,  
Roxanne and Vicky, with grateful appreciation for  
their patience and support throughout this project.*

## ABOUT THE AUTHORS

**Ulric J. (Joe) Gelinas, Jr., Ph.D.**, is Associate Professor of Accountancy and Davis Educational Foundation Fellow at Bentley College, Waltham, Massachusetts. He received his A.B. in Economics from St. Michael's College, Winooski Park, Vermont, and his M.B.A. and Ph.D. from the University of Massachusetts, Amherst. Professor Gelinas has also taught at the University of Tennessee and at Vesalius College, Vrije Universiteit Brussel in Brussels, Belgium. As a Captain in the United States Air Force, he was Officer-in-Charge of IT Operations. Professor Gelinas was the founding editor of the *Journal of Accounting and Computers* (formerly the *Kent/Bentley Journal of Accounting and Computers* and the *Kent/Bentley Review*). Professor Gelinas has published articles on accounting information systems, computers in accounting education, technical communications, and information privacy. In 2000, he received the John W. Beveridge Achievement Award from the New England Chapter of the Information Systems Audit and Control Association for outstanding contributions to the IS Audit and Control profession. He has made presentations and conducted workshops at the International Conference of the Information Systems Audit and Control Association (ISACA), ISACA's Computer Audit, Control and Security (CACS) conferences, as well as other professional groups. He is a member of the American Accounting Association, the Information Systems Audit and Control Association, Beta Alpha Psi, and Beta Gamma Sigma. Professor Gelinas was a member of the U.S. expert panel that reviewed *Control Objectives for Information and Related Technology* (COBIT) and has conducted COBIT workshops throughout the world. He was the author of a portion of *Implementation Tool Set*, a volume that accompanies the second and third editions of COBIT. In his spare time, Professor Gelinas is engaged in his favorite activities: sailing, scuba diving, and bird-watching.