



EDP AUDIT CAREER PATHS

BY

FREDERICK GALLEGOS

GAO EVALUATOR - Los Angeles Regional Office

U.S. General Accounting Office

026066

Biography

FREDERICK GALLEGOS is Manager of the Management Science Group at the Los Angeles Regional Office, General Accounting Office. His primary functions are to research program and agency policies, audit management operations and report to interested members of Congress. He also acts as a consultant to field audit teams where EDP problems exist. Since joining the GAO in 1972, Mr. Gallegos has achieved many accomplishments. He established a Management Science Group with EDP Audit skills in systems design, systems analysis, data retrieval, computer programming, statistical analysis and computer performance evaluation. He assisted in the design, development and implementation of agency-wide data processing training program, GAO Base Level ADP Course and Intro to Microtechnology. Over the past eight years, the Management Science Group has assisted over 400 audit assignments and made major contributions to the written GAO reports of 95 assignments. He was project leader in the development of an EDP Audit and Controls course for DPMA's model curriculum in Information Systems.

Mr. Gallegos has earned an MBA Degree and a BS Degree in Data Processing from the California State Polytechnic University, Pomona. He received his Certified Information Systems Auditor in January 1979, Certificate in Data Education in April 1983, the GAO Meritorious Service Award in October 1978, College Federal Council's Honorable Mention for Accomplishment in Self Development in May 1977, GAO Special Achievement Award in 1976 and is listed in Who's Who in Finance and Industry (1979-Present). Mr. Gallegos has authored and co-authored several books and articles relating to data processing and EDP auditing. He is a member of Cal Poly Alumni Association, the EDP Auditor's Association, the Association for MBS Executives, the Society for Data Educators, and the IS/DPAA Alumni Association.

He is currently a Trustee for the EDP Auditors Foundation for EDUCATION and RESEARCH. Mr. Gallegos has also served as the Executive Vice President and Secretary/Trustee for the Foundation. Further, he has served on the Board of Directors of the EDP Auditors Association/Los Angeles Chapter. Mr. Gallegos has taught numerous graduate and undergraduate EDP courses at California State Polytechnic University, Pomona. Also, he has been responsible for the development and implementation of an MSBA program in EDP Auditing at Cal Poly as well as assisted in the establishment of the Information Systems/ Data Processing Alumni Association. In 1980, he was selected by the Information Systems Department as its Outstanding Alumni. Also, he was selected DISTINGUISHED ALUMNUS, for the School of Business for 1982 - CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA, Ca.

TRAINING AND CAREER DEVELOPMENT FOR

THE EDP AUDITOR

** OUTLOOK

** CAREER PATHS FOR THE EDP AUDITOR

** IDENTIFICATION OF SKILL LEVELS

** TRAINING AND CAREER DEVELOPMENT PLAN

** SELECTION CRITERIA FOR TRAINING COURSES

OUTLOOK

THE NEED FOR A BETTER TRAINED EDP AUDITOR

Although the basic concepts of EDP Auditing have been around since the 1950's and several authorities will even say the 1950's, EDP Auditing as a profession has come into its own in the 1970's. Moreover, if one checks the want ads of most newspapers or even the business classified ads they will see with more regularity, advertisements for EDP Auditors, Internal Auditors with EDP audit experience or Accountants with EDP knowledge and qualifications. The EDP Auditor's demand has grown quite rapidly over the last 4-6 years, especially with reported financial fiascos such as Equity Funding, the Rifkin incidence, the legal issues such as Foreign Corrupt Practices Act and the pending Computer Security Protection Act. With the average loss due to abuse or crime running about \$460,000 to \$720,000, private industry and government have awakened to the reality that the computer is their soft underbellie. If they are shaking now, what about tomorrow? Who will the EDP Auditor be? What training and credentials will he need?

WHERE IS EDP AUDITING GOING

In general, we are in a Technology Evolution phase in the computer field. It has been said by many of the authorities in the field that during the 1980's and 1990's we will have to undergo a revolution in our way of thinking and attacking EDP problems. The EDP Auditor of today will be tomorrow's Information Systems Auditor.

Today's EDP auditors, especially those with international organizations, are feeling the pinch of this future technology. Approaching the audits of distributed processing environments, data base architecture, networks, minicomputers, microcomputers and processors are unlike the traditional installation reviews of yesterday. How does one approach an audit of today's advanced system which may involve one or more combinations of the following: telecommunication, teleprocessing, distributed processing, OCR input, microtechnology, etc. Many are struggling now to answer these questions or attempt to find some explanatory method to approach a solution.

The future technology of the 1980's and 1990's point toward advancements in hardware and software beyond our comprehension. The Computerworld issue of December 31, 1979 presented a range of articles surveying the future. Even in retrospect, the issue cites "The machines of the '70's become antiques of the '80's. They grow bigger, more powerful; we, in proportion, feel smaller. We question their limits--and ours." The Information Systems Auditor of the '80's and '90's will test those limits in ways we today do not think possible or achievable.

In short, the EDP Auditing skills needed by the year 2000 may require extensive knowledge in the following areas:

- Telecommunications
- Teleprocessing
- Microcircuitry
- Firmware
- Embedded systems technology
- Laws involving
 - . Privacy
 - . Security and Fraud
 - . Interstate data transfer
 - . International data transfer

Telecommunication and Teleprocessing

Although some people may laugh, we are only a few years away from the first on-line, real-time financial information system. The developments in the fields of telecommunication and teleprocessing will shrink the communication barrier by a factor of 100 within the next 9-10 years. In recent discussion with several fellow EDP auditors in the banking industry, I was not surprised to hear that their organization's ultimate goal is to have a real-time financial information system. In other words, if a transaction occurs in a California subsidiary, it will immediately appear on the financial books of the New York holding company. Internationally, if it occurs in a Switzerland subsidiary it will immediately appear on the financial account records.

Telecommunications and teleprocessing involve a host of subtopics which the Information Systems Auditor must be able to adequately and capably review. Further, examination of the controls in such system will require a high level of technical expertise. Knowledge of telemetry transfer of data, cryptographics and telecommunication and teleprocessing security will gain increasing importance.

Firmware, Microcircuitry and Embedded Technology

Another area of virtual technology explosion is in the new firmware, microcircuitry and embedded technology that has recently entered the business community. Although such technology is no stranger to advanced weapons systems technology, its applicability to business/information systems community is just now being felt. We are seeing an evolution of new systems technology that can be self-contained or shared in a distributed architecture. The orientation of such systems is toward a total integrated information system designed to tie information channels together.

Again, the challenges from these advancements are coming forth. The Information Systems Auditor must have the knowledge and skills to conduct audits or examination of the firmware and microcircuitry and insure that the information processing that takes place yields valid, reliable and secured information for management decision making. Arthur Young & Company has recently published a brochure on Computer Auditing which characterizes an audit in the year 2001 with the aid of embedded technology. Although they have stated that article is fictitious, they do indicate that with the changes that have occurred and those foreseen in Computer Technology, the concepts are not far from reality or out of the question in the year 2001.

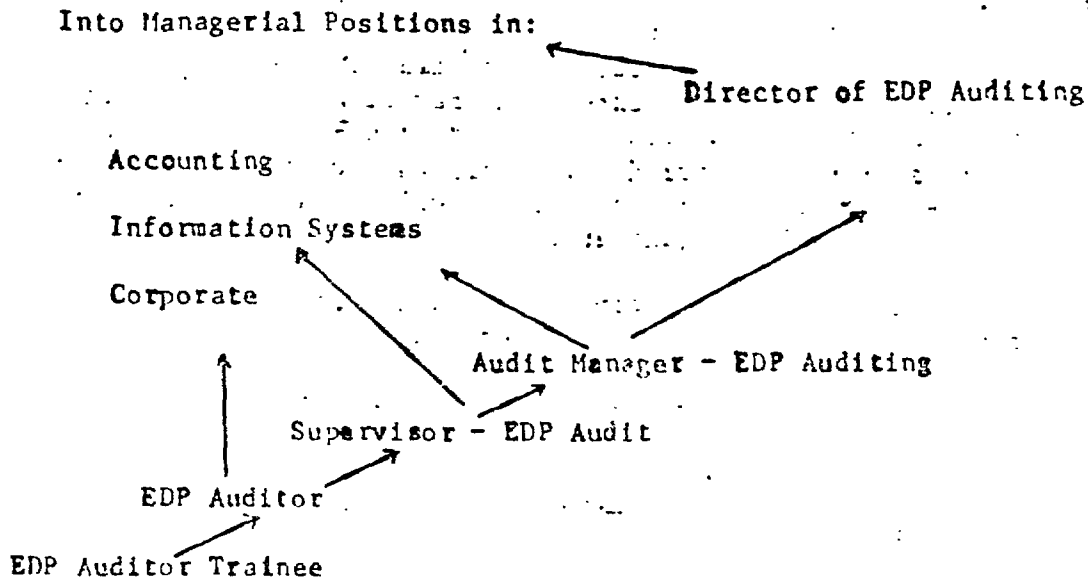
Legal Requirements

If you think the information systems auditor has his hands full with the two prior areas discussed, the legal requirements which have and will be evolving over the next twenty years will have tremendous repercussions in the field. Again, one must take a look to what is happening in Europe and their concern for information privacy and security. Luxemburg, Austria and West Germany see computerized data as a potential weapon in the hands of a wrong person. Therefore, they have enacted strong laws to ensure that individual data and the access to the dissemination of is controlled and protection guaranteed.

The Privacy Act of 1974, Foreign Corrupt Practices Act of 1977, and the pending Federal Computer Security Protection Act are stepping stones to more comprehensive legislation. The information systems auditor will need to clearly understand these laws and apply them in his evaluations of automated systems. Legal implications and restriction on intra-and inter-state transfer of information booms in the future.

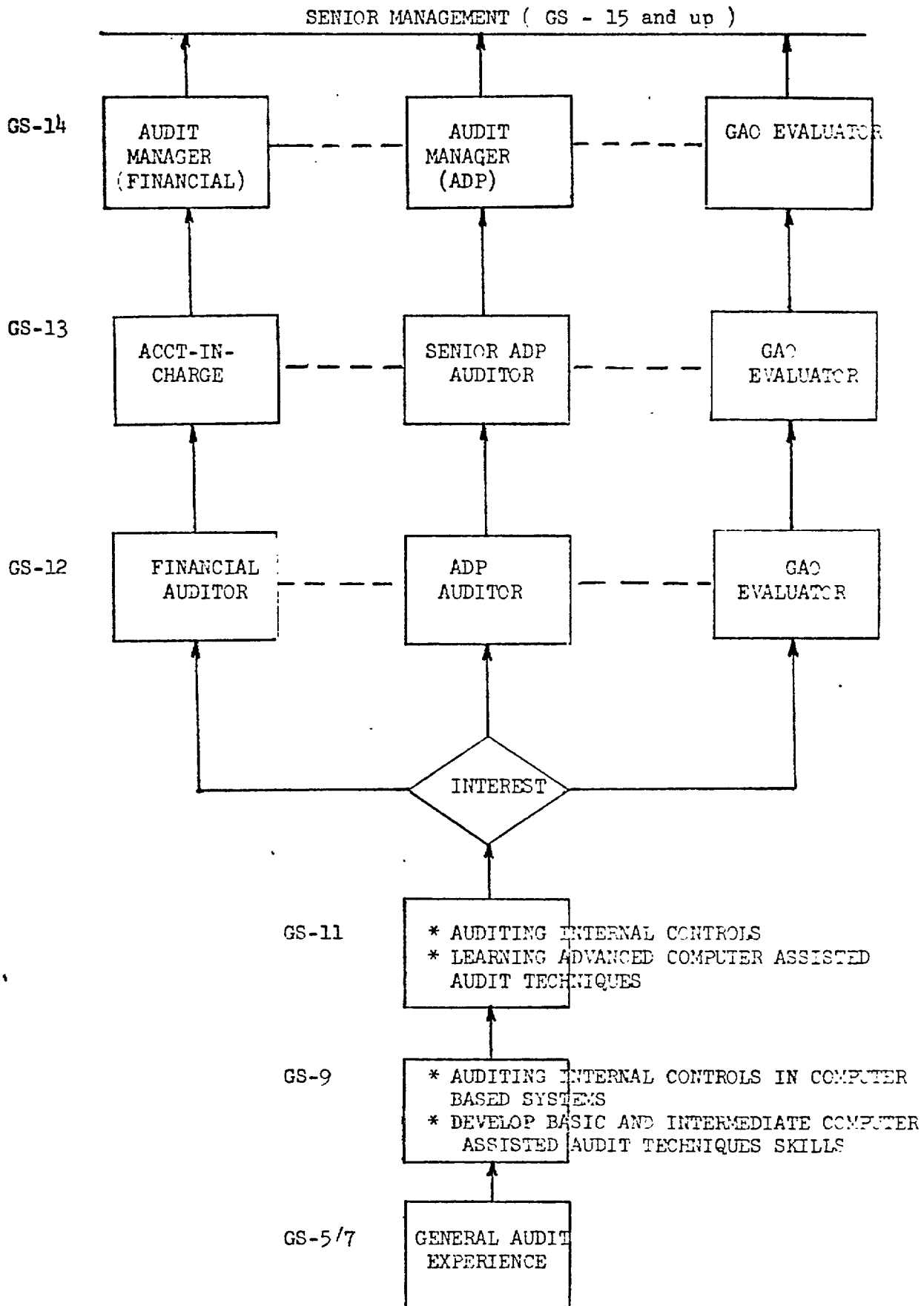
CAREER PATHS FOR THE EDP AUDITOR

CAREER PATH

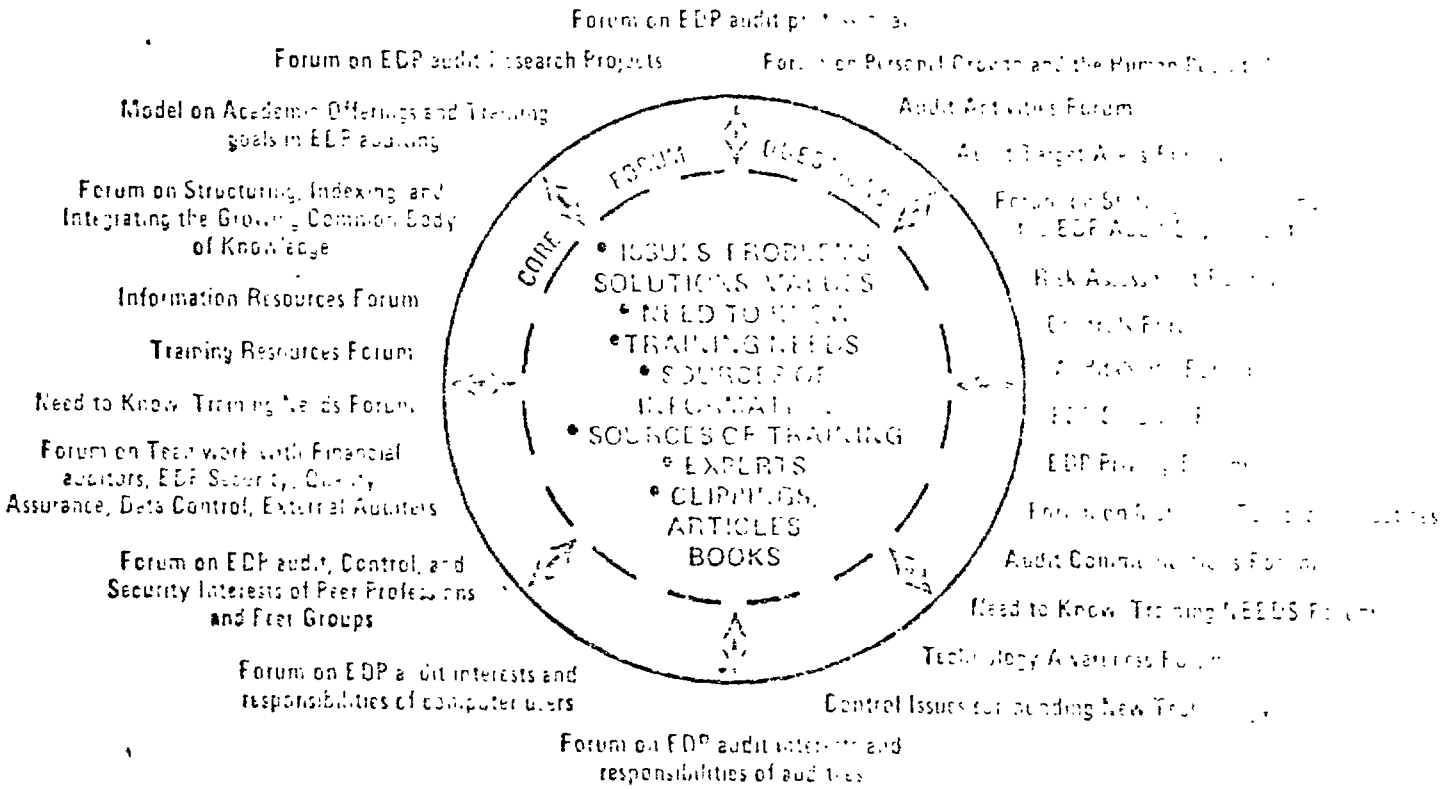


The Career Path is a general illustration; position titles, number of positions and opportunities vary among organizations. At various levels, EDP Auditors receive career opportunities to enter line management roles in Accounting, Data Processing or at the Corporate level as well as to proceed up the career ladder.

CAREER PATH FOR ADP AUDITORS



CREATING AN INFORMATION SHARING NETWORK FOR THE EDP AUDITORS OF THE EIGHTIES



IDENTIFICATION OF SKILL LEVELS

COMPUTER SCIENCE & TECHNOLOGY:

**AUDIT AND EVALUATION
OF COMPUTER SECURITY**



NBS Special Publication 500 19
U.S. DEPARTMENT OF COMMERCE
National Bureau of Standards

OUTLINE

COMMON BODY OF KNOWLEDGE NEEDED TO AUDIT COMPUTER SECURITY

1. COMPUTER SYSTEMS, OPERATIONS, AND SOFTWARE
 - A. Theory of systems (as applied to information systems)
 - B. Theory of computers
 - C. Theory of data communications
2. DATA PROCESSING TECHNIQUES
 - A. Information structures
 - B. Programming languages
 - C. Sort and search techniques
 - D. File creation, maintenance, and interrogation
 - E. Storage devices
 - F. Data management systems
 - G. Integrated systems
 - H. The dynamics of developing, modifying, and maintaining computer software
3. MANAGEMENT OF THE DATA PROCESSING FUNCTION
 - A. Organizational structures
 - B. Personnel selection, training, and management
 - C. Operating and organizational policies and procedures
 - D. Computer operations
 - E. Analysis, design, and programming functions
4. SECURITY OF THE DATA PROCESSING FUNCTION
 - A. The computer center
 - B. Remote sites
 - C. Systems including operating, application, and telecommunications software
 - D. Policies and procedures
 - E. Personnel
 - F. Data handling
 - G. Recovery capabilities
 - H. Tests of internal controls
5. RISK ANALYSIS AND THREAT ASSESSMENT
 - A. Physical facilities
 - B. Remote sites
 - C. Software
 - D. Information
6. MANAGEMENT CONCEPTS AND PRACTICES
 - A. Management tasks, responsibilities, practices, and ethics
 - B. Business administration
 - C. Principles of organizational structures
 - D. Concepts of general management
 - E. Management of the human resource

7. AUDITING CONCEPTS AND PRACTICES

- A. Introductory accounting
- B. Intermediate accounting
- C. Advanced accounting
- D. Cost accounting
- E. Municipal and governmental accounting
- F. Auditing

8. ADDITIONAL QUALIFICATIONS NEEDED TO AUDIT COMPUTER SECURITY

Individuals selected to conduct audits of computer security, in addition to the common body of knowledge outlined above, should have the following qualifications:

1. Sufficient experience to be able to plan, direct, and coordinate audits of large complex functions, activities, or programs,
2. The ability to assign tasks to individuals on the team and to identify the specific disciplines and expertise needed to perform the work, and
3. The ability to conduct conferences and to prepare, present, and process the report describing the results of the work.

**GENERALIST EVALUATOR
ADP CAPABILITY ASSESSMENT**

CAPABILITY STATEMENTS

LEVEL OF AGREEMENT

**USEFULNESS IN APPLYING
ADP CAPABILITY PRINCIPLES**

**AT WHAT LEVEL
CAN BE TRAINING
THIS CAPABILITY**

CAPABILITY STATEMENTS	LEVEL OF AGREEMENT					USEFULNESS IN APPLYING ADP CAPABILITY PRINCIPLES					AT WHAT LEVEL CAN BE TRAINING THIS CAPABILITY		
	1 STRONGLY AGREE	2 AGREE	3 NEUTRAL	4 DISAGREE	5 STRONGLY DISAGREE	1 EXTREMELY USEFUL	2 CONSIDERABLE USE	3 OF USE	4 NOT VERY USEFUL	5 OF NO USE	1 NOT AT ALL	2 BELOW ME AS LEVEL	3 AT MY AS LEVEL
60. GAO Evaluators use ADP staff to produce generalizable samples.	1	2	3	4	5	1	2	3	4	5	1	2	3
61. GAO Evaluators know common structure and forms of data obtainable from the computer.	1	2	3	4	5	1	2	3	4	5	1	2	3
62. GAO Evaluators have a working knowledge of common errors found in computer output.	1	2	3	4	5	1	2	3	4	5	1	2	3
63. GAO Evaluators understand how data flows through a computer system.	1	2	3	4	5	1	2	3	4	5	1	2	3
64. GAO Evaluators understand ADP alternatives in following audit guidelines/objectives.	1	2	3	4	5	1	2	3	4	5	1	2	3
65. GAO Evaluators use ADP staff to pull items from agency records.	1	2	3	4	5	1	2	3	4	5	1	2	3
66. GAO Evaluators understand the limits of the computer.	1	2	3	4	5	1	2	3	4	5	1	2	3

DIRECTIONS:

Indicate your response by circling one number from each block of columns.

TRAINING AND CAREER DEVELOPMENT PLAN

GAO EVALUATOR (ADP AUDITOR) CURRICULUM

Advanced Grades 14/15	Advanced Supervision	Program Evaluation	Auditing Tele- communica- tions	Auditing System Software	Auditing Data Base Management Systems	
Project Leader Grades 13/14	Elements of Supervision	Producing Organized Writing & Effective Reviewing	Advanced ADP Concepts	Intro to Computer Performance Evaluation	Auditing ADP Acquisitions	Computer Assisted Audit Techniques II
Sub-Project Leader Grades 12/13	Auditing and Job Management	Skills for Performance & Career Development	Computer Security & Privacy	Internal Controls in Automated Systems	Computer Assisted Audit Techniques I	Systems Analysis
Intermediate Grades 11	Conducting Program Results Reviews	Intermediate Writing	Base Level ADP-II	System Design & Development	ADP Management and Operations	EWS Applicat ----- Micro Applications
Entry-Level Grades 5/9	Entry Level Training	Orientation	Base Level ADP-I	Use of Models & CPS Research Techniques	Intro to SPSS & S.A.S.	Statistical Sampling EWS and Microtechnolo



ADP SYSTEM REVIEWS

Grade	Basic Audit Courses	Orientation in ADP	Basic ADP Courses	Methodology-Oriented Training	ADP Technical Assistance Training	Specialized Technical Assistance Courses	On-The-Job Experience
15	.Methodology Seminar .Organizing and Planning Seminar .Leadership Seminar	.ADP for Managers					.Manage an ADP System Review Group
14	.Advanced Methodology .Issue Area Training .Project Planning and Organizing .Managing for Productivity .Advanced Supervision			.Conferences and Seminars		.Conferences and Seminars	.Supervise Multiple ADP System Reviews
13	.Preparing Effective Presentations .Budgeting In Review .Advanced Writing			.ADP Controls III			.Supervise an ADP System Review
12	.Advanced Job Design .Project Design and Scoping .Elements of Supervision		.System Software .Data Base Management Systems .Data Communications .ADP Personnel Management		.Computer-Assisted Audit Techniques II		.ADP System Review Experience
11	.POWER .Auditing and Job Management Skills		.System Design .Data Center Operations .Comparative Computer Systems	.ADP Controls II	.DYL-280 II		.ADP System Review Experience
9	.Intermediate Writing .Quantitative Skills .Conducting Program Results	.Computer-Assisted Audit .ADP Controls I			.DYL-280-I .Job Control Language		.Computer-Assisted Audit Technique Experience
7	.Entry-Level Training .Government Operations .Orientation	.Introduction to ADP Audit-Auditing .Introduction to Data					.General Audit Experience

COMPUTER ASSISTED AUDIT TECHNIQUES II

OBJECTIVES: To provide individuals with advanced knowledge in the use of computer retrieval packages (DYL-260 and DYL-AUDIT) and program documentation packages (DAS and DAD), and how they have been and can be applied to audit work.

CONTENT: The course is divided into 4 basic learning elements as follows:

- Advanced DYL-260 concepts and programming to include: editing, last-time logic, macros, subroutines, linkage, fixed position printing and others,
- DYL-AUDIT discussion and use,
- DAS and DAD discussion and use, and
- Class problem using the above techniques.

TECHNOLOGY: High assisted lecture with hands-on exercises.

LENGTH: A 5 day program.

INSTRUCTORS: Two to three senior ACP students with an in-depth knowledge of the subject.

PRE-REQUISITES: All base level, and previous course 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, or equivalent knowledge.

RECOMMENDED PARTICIPANTS: ACP students with a minimum of 1 year of experience.

FREQUENCY: Offered twice a year.

CLASS SIZE: 15-16 students.

STATUS: Under development.

INTERNAL CONTROLS IN AUTOMATED SYSTEMS

OBJECTIVES: To provide individuals with an overall understanding of MRP internal controls which can be used to evaluate the reliability of computerized data and the adequacy of security over computerized systems.

CONTENT: The course is divided into 11 basic learning elements as follows:

- Organization Controls,
- System Development,
- Data Center Management,
- Data Center Security/Protection,
- Data Origination,
- Data Entry Preparation, Validation,
- Data Communication Controls,
- Computer Processing Controls,
- Processing Controls: a. Automated Type
- Data Administration, etc.
- Output Processing.

METHODOLOGY: Appropriate use of the course material will be made by students. The course will be presented in a lecture group discussion and practical sessions and interrelated.

LENGTH: A 5 day program.

INSTRUCION: One instructor who has experience in the field of MRP internal controls and is capable of presenting and leading internal controls.

PREREQUISITES: Basic level MRP I & II or equivalent knowledge.

RECOMMENDED PARTICIPANTS: MRP business and computer specialists, etc.

FREQUENCY: Offered twice a year.

CLASS SIZE: 12-15 students.

STATUS: Present course under revision.

COMPUTER SECURITY AND PRIVACY

OBJECTIVES: To expose the individual to legal, political and public policy aspects of privacy and security within computerized systems, and to present a framework on which the participants can build upon to ensure that necessary safeguards exist in computerized systems.

CONTENT: The course is divided into 8 basic learning elements as follows:

- History of information systems privacy,
- Legal environment,
- Civil liberties,
- Total system security,
- Environment security,
- Installation security,
- Software security, and
- Cost/benefit analysis.

METHODOLOGY: Class room instruction, group discussion, and exercise.

LENGTH: A 3 day program.

INSTRUCTORS: Office of Personnel Management (OPM)

PRE-REQUISITES: Basic level ACP I & II or equivalent knowledge.

RECOMMENDED PARTICIPANTS: ACP Airmen and Civilians.

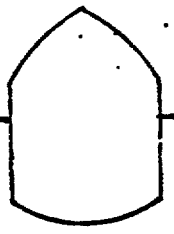
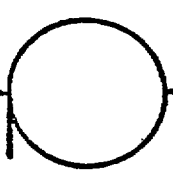
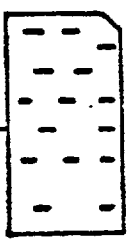
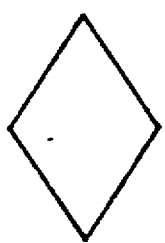
FREQUENCY: Offered 4 times a year.

CLASS SIZE: 10-24 students.

STATUS: Available as STC per student.

TRAINING PROGRAM FOR COMPUTER AUDITORS

FP



INTERAGENCY AUDITOR

TRAINING PROGRAMS

III OVERVIEW OF TRAINING PROGRAM

This training program is designed to provide the specialized ADP training necessary to equip general auditors with the knowledge, skills, and professional competence needed to conduct audits in an ADP environment. The program includes the general concepts or ADP subject areas that computer auditors should be familiar with, along with a curriculum of suggested courses. Beginning with basic ADP, the program progresses step-by-step through more difficult intermediate courses. At this point, the general auditor should be a competent computer auditor--provided that auditor has had sufficient on-the-job experience. Advanced courses in several subject areas are suggested to help the auditor keep up-to-date or to meet special needs.

BASIC.	GENERAL AUDITORS.	Basic ADP Auditing
		ADP Controls & Computer Auditing
		Computerized Data Retrieval Packages
INTERMEDIATE.	COMPUTER AUDITORS.	System Design & Development
		ADP Acquisitions
		Computer Security and Privacy
		Computer Operation & Performance
ADVANCED.	SENIOR COMPUTER. AUDITORS	Computer Programming
		Computer System Software
		Current Computer Technology
EXECUTIVE.	AUDIT SUPERVISORS. AND MANAGERS	ADP for Audit Managers
	All.	Continuing Education

V ADP CONTROLS AND COMPUTER AUDITING

Provides a study of internal controls in automated systems and detailed procedures for evaluating these controls in audits of computerized systems.

Internal Controls in Automated Systems

Interagency Auditor Training Programs

Auditing Batch Processing Systems

Being Developed By Interagency Auditor Training Programs

Auditing On-Line Systems

Office of Personnel Management

Auditing Advanced ADP Systems

Interagency Auditor Training Programs

Prevention and Detection of Fraud and Abuse in a Computer Environment

Being developed by Interagency Auditor Training Programs

SELECTION CRITERIA FOR TRAINING COURSES

SELECTION CRITERIA FOR COURSES

1. Does the course support our organization's short term goals or objectives?
2. Does the course provide new or innovative techniques which can benefit the organization?
3. TYPE OF INSTRUCTION PROVIDED IS WORTHWHILE
4. MEDIA AND ANTICIPATED LEVEL OF EFFECTIVENESS

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

IS ~~433~~ ⁴³³

EDP Auditing

Mr. Gallegos

I. PREREQUISITES

IS 225, IS 224 or IS 244 and completion of at least one ACC 300 level class or consent of instructor

II. ATTENDANCE

Punctual attendance is expected at all class meetings. In case of absence, it is the student's responsibility to find out about the assignment or lectures and prepare accordingly. Assignments will be accepted late only when sickness or extenuating circumstances exist.

III. HOMEWORK AND QUIZZES

Several homework problems will be assigned. It may be to your advantage to look at other problems in your reading in order to be sure you have understood the material. Quizzes may be given over lecture and/or reading materials.

IV. EXAMINATIONS

There will be one (1) midterm examination plus the final examination. No make-up will be allowed unless instructor is contacted the same day or the day before the absence.

V. GRADING

Final grade will be based on:

Projects	35%
Homework & Quizzes	15%
Midterm Examination	25%
Final Examination	25%
	<u>100%</u>

VI. REQUIRED MATERIALS

1. Text: Mair, Wood and Davis, Computer Control & Audit; Q.E.D. Information Sciences, Institute of Internal Auditors.
2. Binder: 3-ring with 10 tabs (one for each week)
3. Flowcharting template

Student Fall 012 33
2 nyls/wk 2 hrs review

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

IS 499

EDP Auditing

Mr. Gallegos

Assignment Sheet

<u>Week</u>	<u>Subject</u>	<u>Assignment</u>
1	Introduction to EDP Auditing Professional and Government Standards in EDP Auditing	Chapter 1,2 Project 1 assigned
2	Types of EDP Audits	Chapters 3,6,11,15
3	Evaluating EDP Controls	Chapters 4,7,12
4	Planning the EDP Audit Approach	Chapter 5, 16, 17
5.	Risk Assessment Review	Project 1 due Project 2 assigned
6.	Midterm Exam	
7.	Auditing EDP Applications	Chapter 8-10
8.	Auditing Systems Development Activities	Chapter 13,14
9.	Auditing Information Processing Facilities	Chapter 18,19
10.	Open	Project #2 due
	Final Exam -- Tuesday,	6:00 p.m.

Can bring in 3 people for Govt fee.

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

GBA 577

Advanced EDP Auditing

Mr. Gallegos

This course will explore some of the newer techniques and methodologies used by EDP Auditors in evaluating information systems. The development of the EDP Audit function will be covered as well as techniques used in managing the EDP Audit Process. Advanced EDP Audit topics will be covered such as audits of complex system, minicomputer, distributed systems, and computer performance evaluation.

I. PREREQUISITES

IS 433 or consent of instructor

II. ATTENDANCE

Punctual attendance is expected at all class meetings. In case of absence, it is the student's responsibility to find out about the assignment or lectures and prepare accordingly. Assignments will be accepted late only when sickness or extenuating circumstances exist.

III. HOMEWORK AND QUIZZES

Several homework problems will be assigned. It may be to your advantage to look at other problems in your reading in order to be sure you have understood the material. Quizzes may be given over lecture and/or reading materials.

IV. EXAMINATIONS

There will be one (1) midterm examination plus the final examination. No make-up will be allowed unless instructor is contacted the same day or the day before the absence.

V. GRADING

Final grade will be based on:

Research Paper	20%
Projects (2)	30%
Homework & Quizzes	10%
Midterm Examination	20%
Final Examination	20%
	<hr/>
	100%

VI. REQUIRED MATERIALS

1. Text: Mair, Wood and Davis, Computer Control & Audit; Q.E.D. Information Sciences, Institute of Internal Auditors
2. Text: Perry, William E., Selecting EDP Audit Areas, EDP Auditors Foundation.
3. Binder: 3-ring with 10 tabs (one for each week)
4. Flowcharting template

VII. PROJECTS: Application Review Case Problem

Winter 4/72
2/11/72

ASSIGNMENT SHEET

<u>Date</u>	<u>Subject</u>	<u>Assignment</u>
Jan. 5	Establishing the Areas of EDP Audit Involvement. Building an EDP Audit Charter	Chapter 1 (Perry) Chapter 2 (Perry) Project 1 assigned Research Paper assigned
Jan. 12	Auditing EDP Applications	Chapter 10 (Mair, Wood, Davis) Chapter 3-5 (Perry)
Jan. 19	New Techniques in Selecting Applications for Audit	Chapters 6-10 (Perry)
Jan. 26	Auditing System Development	Chapter 13, 14 (Mair, Wood, Davis)
Feb. 2	Auditing the Information Processing Facility and Developing the EDP Audit Plan	Chapter 19 (Mair, Wood, Davis) Chapter 11 (Perry)
Feb. 9	MIDTERM EXAM/OPERATIONAL EDP AUDITS	Project 1 due Project 2 assigned Chapter 23 (Mair, Wood, Davis)
Feb. 16	Auditing Advanced Application Systems	Chapter 20 (Mair, Wood, Davis)
Feb. 23	Auditing Minicomputers and Dealing with Computer Abuse	Chapter 21, 22 (Mair, Wood, Davis)
March 2	Managing EDP Audits	Chapter 24 (Mair, Wood, Davis)
March 9	Review for Final	Research Paper due

Final Exam -- March 17, 1982 (6:00 pm - 8:00 pm)

GBA 577 ADVANCED EDP AUDITING

Research Paper

On an advanced EDP Audit area selected by your instructor, due March 9, 1982. Paper should be in accordance with Guidelines provided.

PROJECTS

1. Application Review Case Problem
 - . Auditing a Model Used to Assess EED
 - . Auditing a Microcomputer Application
2. Implementation of an Integrated Test Facility in an On-line System

COMPUTERS AND ACCOUNTING: A DYNAMIC DUO

by
JOHN R. CRUMPLER, CDP
The University of West Florida
Pensacola, Florida

BACKGROUND

The recent release of the DPMA Model Curriculum will provide many colleges and universities with the opportunity to augment their computer related curricula with viable business data processing programs. Educational institutions have not typically responded to industry demands for relevant business data processing degree programs. Previously, most computer curricula were located in engineering schools which restricted the evolution of business data processing programs. The DPMA Model Curriculum was badly needed—in fact, it was needed 10 years ago. I encourage any institution to consider the merits of the DPMA model and, further, to consider the curriculum model outlined herein as an alternative or as a complimentary “specialized” business data processing degree program.

The University of West Florida (UWF) in Pensacola implemented a Systems Science-Business degree program in 1966 that closely paralleled the DPMA Model Curriculum. In 1978, UWF designed and implemented an additional, complimentary undergraduate degree program in Accounting Information Systems (AIS); and more recently in 1981, implemented a related Masters degree program (MAIS).

THE CURRICULUM CONCEPT

The AIS concept combines traditional accounting and business computer coursework, with emphasis on the design and development of computerized accounting systems with in-built internal controls, and auditing in a computer environment. The AIS program was founded on the premise that small businesses can now afford a computer but not a professional accountant and a professional data processor. UWF's AIS program is designed to develop student skills in both areas, while addressing this new “small business” need. Many traditional and unique job markets are addressed by the program also, by virtue of its double-major content.

JOB MARKETS ADDRESSED

The successful AIS graduate is prepared to assume the several professional roles required in the small business environment such as the Accountant/Controller, the Systems Analyst/Programmer, and the Internal EDP Auditor. Characteristic of the small business environment, a professional manager must possess a multiple of skills. The AIS program provides the data processing dimension required by today's small business manager.

In the larger business environment, the AIS graduate is prepared for professional positions in accounting, data processing, and auditing. As an Accountant, the AIS graduate is able to uniquely contribute to the accomplishment of corporate goals by virtue of their complementary skills in data processing. The communications gap that exists between data processors and users, and the often resulting poorly designed systems, is well known. The AIS professional, skilled in both accounting and data processing, will have a unique opportunity to positively affect the quality and effectiveness of corporate accounting information systems. Further, as microcomputers and distributed data processing add technological sophistication to accounting departments, these dually skilled AIS graduates will play even more direct roles in the development and implementation of computerized accounting systems.

Many AIS graduates are hired by large businesses as Systems Analyst/Programmers. Again, the AIS graduate narrows the communications gap, this time by virtue of being knowledgeable of the area to computerized: Accounting. The value of being knowledgeable of the subject area to be automated seems intuitive, yet educational programs have only recently evolved to more adequately address the problem.

One of the newest career fields evolving as a result of computer technology and its impact on the accounting profession is EDP Auditing. Auditors who do not possess the ability to audit and evaluate in a computerized environment are unable to certify the validity of the financial information produced by the computer systems of today's businesses. The AIS graduate is uniquely qualified for entry level positions in this job market, one that requires dual skills in accounting/auditing and computer systems.

Consulting with businesses in the area of computers and accounting systems is a rapidly growing industry. Small businesses are particularly impacted by computer technology and often depends on outside consultants for many related needs. Independent consulting firms and CPA Management Advisory Service firms will require the expertise of professionals skilled in accounting, computers, business law, taxation, and finance. AIS graduates are in great demand by these firms.

Graduates of the program have been pleased with the interest displayed by corporate recruiters. Starting salaries have typically ranged between \$18,000 and \$22,000 with some in excess of \$26,000.

THE AIS PROGRAM

Unique computer support was provided for this new, innovative degree program. UWF purchased four small business computers and applications software for dedicated use by the AIS program. The computers, Burroughs B93 minicomputers, provide for a state-of-the-art, on-line interactive systems design and hands-on educational experience. The software packages, such as General Ledger, Payroll, Accounts Payable, Accounts Receivable, Inventory, Manufacturing, and more, are studied conceptually prior to analyzing the specifics of the Burroughs packages. The minicomputer lab facility reflects UWF's commitment to a quality program and to the technical depth of the AIS program.

The program requires a minimum of 123 semester hours, summarized as follows:

General Education:

English	9
Mathematics	9
Physical Sciences	6
Social Sciences	6
Humanities	6
subtotal	36

Business:

Accounting	27
AIS Capstone	12
Data Processing	19
Economics and Finance	15
Management and Marketing	6
Business Law	6
subtotal	87
Total semester hours	<u>123</u>

The following categorical list of courses illustrates the strategic design of the undergraduate AIS program that targets all five job markets previously described.

Traditional Accounting and Related Courses

Accounting Principles	(2)
Intermediate Accounting	(2)
Managerial (Cost) Accounting	(2)
Tax Accounting	(1)
Auditing	(1)
Advanced Accounting	(1)
Managerial Finance	(1)
Money and Banking	(1)
Corporate Finance or Investment Theory	(1)
Business Law	(1)

Traditional Data Processing Courses

Intro. to Data Processing W/BASIC	(1)
COBOL (Structured)	(1)
Assembler Language	(1)
Computer Operations	(1)
File Structures and Access Methods	(1)
Advanced COBOL (Structured)	(1)
Data Base Systems or Microcomputer Architecture	(1)

Capstone AIS Courses

Manual Accounting Systems and Internal Controls	(1)
Design and Development of Computerized Accounting Systems	(2)
EDP Auditing	(1)

Other Required Courses

Management Principles	(1)
Marketing Principles	(1)
Business Writing	(1)
College Algebra	(1)
Statistics	(1)
Quantitative Methods	(1)
Economic Principles	(2)
Other General Education	(9)

THE CAPSTONE COURSES

Traditional accounting courses are typically problem oriented and seldom present accounting as a system designed to provide for the financial information needs of businesses. Most data processing courses are also void of a systems perspective, concentrating on individual programming tasks. Upper level systems design courses bring the integrated systems perspective to data processing majors but these students are typically lacking in knowledge of the application area being studied.

The AIS capstone courses provide for the study of accounting as an information system, the design and development of computerized accounting applications, and aspects of auditing computerized accounting systems. At UWF, the AIS courses are taught by the accounting faculty who have actual work experience in these respective areas.

Manual Accounting Systems and Internal Controls is a course that introduces the concept of accounting as an information system, with emphasis on the flow of information through the corporate structure and in-built internal control safeguards. Students are required to develop a policies and procedures (user's) document for a manual accounting information system that will meet the needs of a case study small business. Customer invoices, purchase orders, checks, and requisition documents are designed by the students with format, data elements, prenumbering (and other internal control features) as areas of evaluation. The process of systems analysis and design is studied prior to assigning the case study project. Prerequisites: Intermediate and Managerial Accounting, Introduction to Data Processing.

The two courses in Design and Development of Computerized Accounting Systems are consecutive term courses concentrating on the computerization of specific accounting applications such as General Ledger, Accounts Receivable, Payroll, Accounts Payable, Inventory, etc. Methods for implementing internal controls and operational controls within computerized systems is emphasized, including password protection, batch balancing and adequate audit trail. Students are required to design the case study application in the first term and to produce quality user and systems documentation. On-line, interactive, real-time data entry processes are accommodated by the B93 minicomputers providing state-of-the-art education for the AIS students. The students develop and demonstrate their systems in the second term using the COBOL programming language and the B93 computers. During both terms, the students are assigned lab exercises requiring the operation of purchased B93 software packages and prepared data bases that simulate corporate activity. The students work in teams but with individual assignments and are required to operate the B93 computers themselves for hands-on experience. The AIS minicomputer lab is available 24 hours a day through cypher lock access and with lab assistants on a scheduled basis. Prerequisites: Manual Accounting Systems and Internal Controls, File Structures and Access Methods, Advanced COBOL.

The EDP Auditing course examines the concepts of auditing around the computer as well as through the computer. Simulated payroll processings using the B93 purchased software and prepared data bases provide the basis

for a case study project. Other areas of study include effectiveness evaluation of an existing system using the purchased software packages, and analyzing the role of the auditor in the various systems development phases. General purpose data extract software is utilized by the students as an integral part of the audit case. Prerequisites: Manual Accounting Systems and Internal Controls, COBOL.

THE MAIS GRADUATE PROGRAM

The MAIS program was initiated in order to provide graduates of the more traditional undergraduate accounting programs with significant and relevant coursework in data processing, computerized accounting systems and accounting research. Graduate courses paralleling the undergraduate AIS capstone courses provide these traditional program graduates with an appropriate educational update for today's computerized business environment.

The needs of AIS undergraduates are also accommodated by two special tracks within the MAIS program: MAIS Management and Professional Preparation. The MAIS Management track is an extension of the undergraduate AIS program and provides breadth to the student's education. Graduate courses in management, marketing, economics, math and statistics, MIS management, accounting and current topics in accounting systems constitute the MAIS Management track. The Professional Preparation track provides AIS undergraduates with the opportunity to broaden their accounting education and prepare for the CPA exam. UWF is noted nationally for the success ratios of its students taking the CPA exam.

The MAIS program tracks are rigorous and require a minimum of 30 semester hours for properly prepared students. Corporate recruiters were extremely interested in the first graduating class of our MAIS program.

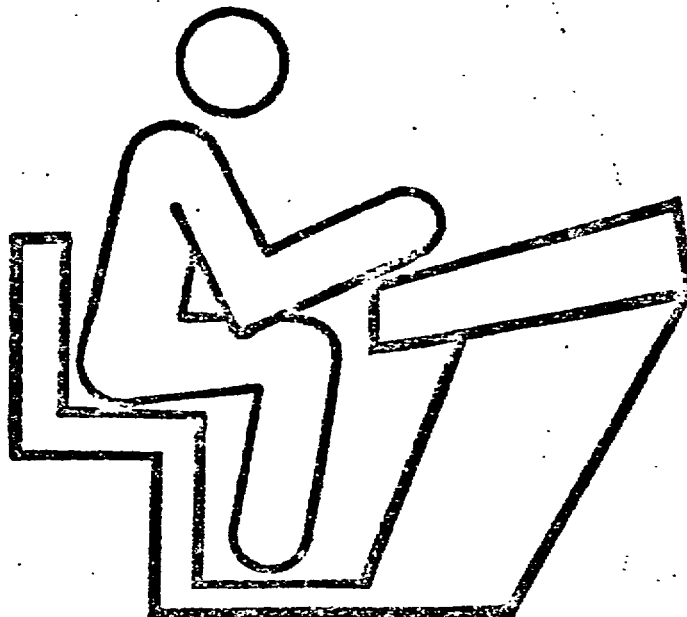
SUMMARY

The Accounting Information Systems (AIS) undergraduate degree program is ideal for the only business data processing curriculum of any college, or as a specialized, complimentary program. The AIS concept strategically combines accounting and computer coursework with emphasis on the design of computerized accounting systems with in-built internal controls and auditing in a computer environment. The program uniquely addresses multiple job markets and in particular, the needs of small businesses using computers. Computer fraud and embezzlement may dictate that systems analysts become knowledgeable of internal controls and adequate audit trail procedure. Curricula of the AIS concept may well be the next evolution of business data processing degree program.

REFERENCES

1. Jones, Ron and Rich Hamilton. "Computing Education, The DPMA Model." Computerworld, September 21, 1981, p. 69.
2. Page, John and Paul Hooper. Accounting and Information Systems, Second Edition, Reston, 1982.

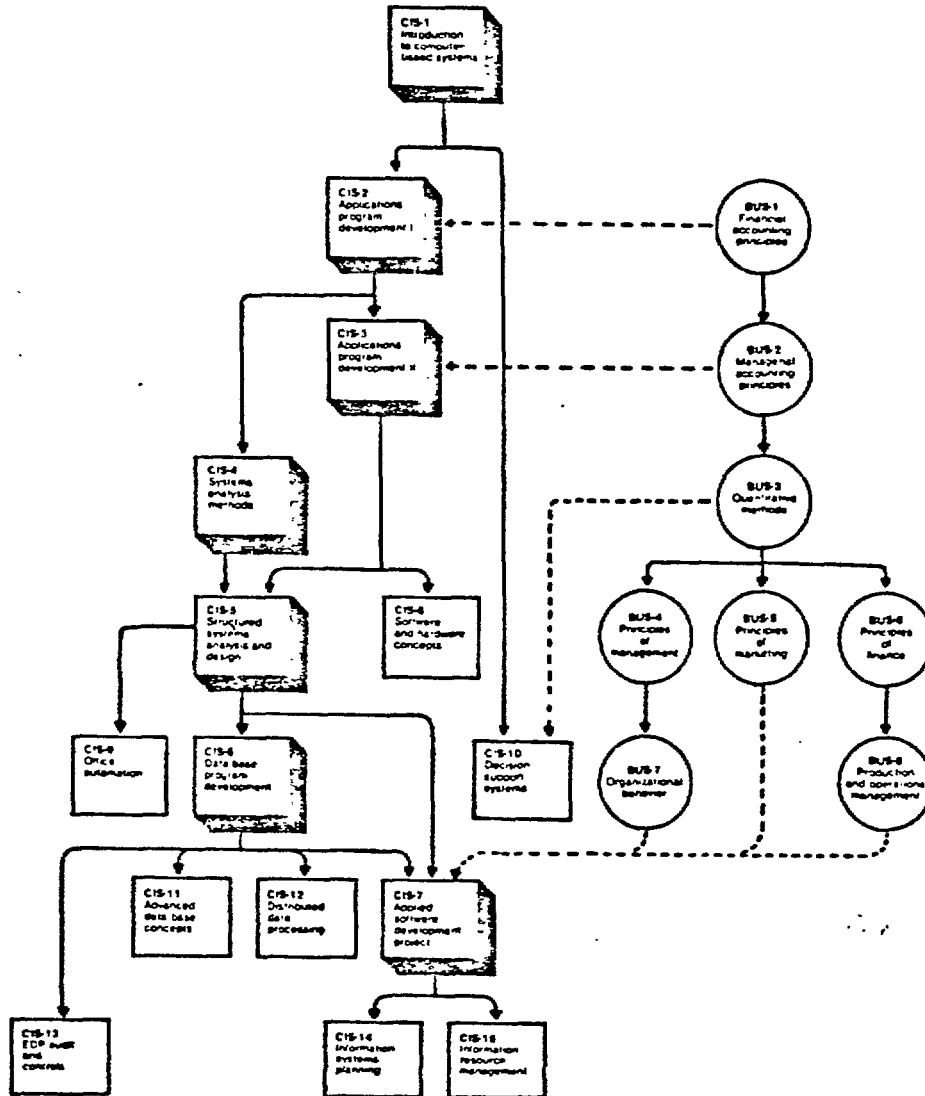
DPMIA Model Curriculum for Undergraduate Computer Information Systems Education



CIS Curriculum Structure

Figure 1 shows the relationships between the required, the recommended elective, and the business support courses. Connecting lines in the diagram indicate progression through the coursework and prerequisite courses. Note that courses CIS-1 through CIS-4 are lower-division courses and CIS-5 through CIS-15 are upper-division courses. The hierarchy implied in the diagram is roughly equivalent to the eight-semester sequence of undergraduate schooling.

Figure 1. Structure of DPMA Model Curriculum for Computer Information Systems



CIS-13 EDP AUDIT AND CONTROLS

COURSE DESCRIPTION

An introduction to the fundamentals of EDP auditing. Emphasis on EDP controls, types of EDP audits, and concepts and techniques used in EDP audits. Exposure to risk assessment and professional standards in the field of EDP auditing. Prerequisite: CIS-6, Database Program Development.

STUDENT OUTCOMES

To develop an understanding of the EDP audit environment and processes. To realize the importance of EDP controls and the effect poor controls can have within a computer-based information system. To gain an understanding of the various kinds of audits performed of computer-based information systems and operations. To gain an appreciation of and motivation for proper data processing practices and management.

COURSE CONTENT

1. EDP Audit Environment and Computer Information Systems (10%) Skill Level 3
The EDP audit environment and its relationship with and effect on computer-based information systems. Relationships between the internal audit function, the external audit function, the public accounting function and the information systems function. EDP audit definitions. Discussion of major examples of computer abuse and their impacts on the business community.
2. Information Systems Controls (25%) Skill Level 3
Types of information systems controls: application controls, system development controls, information processing facility controls and horizontal control vs vertical controls. Preventive, detective and corrective controls. Controls and security.
3. Computer Audit Techniques (30%) Skill Level 2
Types of EDP audits: audits of applications, audits of systems development, audits of information processing facilities and SAS-3 reviews. Computer-assisted audit techniques such as test decking, integrated test facility, parallel simulation, system control audit review file, sample audit review file, snapshot, extended records, etc. Uses of audit software to verify results: confirmation, comparison with file or physical and edit and reasonableness tests. Advantages and disadvantages of computer-assisted audit techniques.
4. Auditing Advanced Information Systems (20%) Skill Level 2
Techniques used to audit advanced systems which utilize a combination of any one of the following information processing techniques: on-line, real-time, teleprocessing, telecommunication, distributed processing, minicomputer, microcomputer, data bases, etc. Techniques used to audit data base systems. Cost of advanced controls. Audit technical expertise needed. Examination of minicomputer and microcomputer applications and environment.

5. Systems Approach to Auditing (15%)**Skill Level 3**

Concept and application of risk assessment. Concept and application of threat analysis. Concept and application of cost/benefit analysis in analyzing exposures and recommending controls.

COURSE APPROACH

This course provides fundamental knowledge of the EDP audit environment and processes. Although the course requires fundamental knowledge of accounting principles and processes and auditing concepts, these are used in the course to benefit and expand the knowledge of the information systems specialist.

Emphasis throughout the course should be on the importance of EDP controls, EDP audit reviews and their interaction with the business organization, especially the information systems department. The course will cover EDP control and computer audit techniques. The methodology used to introduce these topics is left to the discretion of the instructor; however, it should be representative of the current philosophy toward the examination of EDP controls and use of computer audit techniques.

There should be sufficient opportunity for limited research and moderate application of some of these concepts and practices through computer laboratory exercises, case studies and research papers. Included in the exercises should be requirements to design and develop an audit software program to verify results of a business application (e.g., general ledger system, payroll system, inventory control system, and the like).

There should be ample opportunity for students to accomplish two projects during the course. The first project should be a research paper on an EDP audit-related topic or a test data case could be used to provide hands-on experience. The second project should require students to apply the concepts and practices learned through a case study involving the use of an audit retrieval language, or, if one is not available, through use of a COBOL program written especially for that purpose.

SELECTED REFERENCES

Books:

Burch, John C., Jr. and Sandinas, Joseph L., Jr. Computer Control and Audit: A Total Systems Approach. New York: John Wiley and Sons, 1978.

Davis, Gordon B., Schaller, Carol A., and Adams, Donald L. Auditing & EDP. 2nd edition. New York: American Institute of Certified Public Accountants, 1981.

Mair, William C., Wood, Donald R., and Davis, Keagle W. Computer Control and Audit. Altamonte Springs, Florida: Institute of Internal Auditors, Inc., 1976.

Porter, W. Thomas and Perry, William E. Controls and Auditing. 3rd edition. Boston, Massachusetts: Kent Publishing Co., 1981.

Weber, Robert A. G. EDP Auditing: Conceptual Foundations and Practice. New York: McGraw-Hill, 1981.

Case Studies:

"Case Studies in Computer Control and Auditing." Funded by The Touche Ross Foundation, June, 1978.

"Fedco Case Study". Frederick Gallegos, U.S. General Accounting Office, Los Angeles, California.

Publications:

"Audit and Evaluation of Computer Security," National Bureau of Standards Publication 500-19, 1977.

"Audit and Evaluation of Computer Security II: Systems Vulnerabilities and Controls," National Bureau of Standards Publication 500-57, 1980.

Computer Audit Guidelines. Canadian Institute of Chartered Accountants, 250 Bloor St. E., Toronto, Canada, 1975.

Computer Control Objectives-1980. EDP Auditor's Foundation, 373 Schemle Rd., Carol Stream, IL 60187.

EDP Auditor's Journal, EDP Auditor's Foundation, 373 Schemle Rd., Carol Stream, IL 60187.

EDP Auditor's Update. EDP Auditor's Foundation, 373 Schemle Rd., Carol Stream, IL 60187.

Management, Control, and Audit of Advanced EDP Systems. New York: American Institute of Certified Public Accountants, 1977.

Supplementary Audit Standards for Auditing Computer- used Systems. U.S. General Accounting Office, 441 G. St., N.W., Washington, D.C. Attn: Special Publications.

Systems Auditability and Control -- Audit Practices. Altamonte Springs, Florida: Institute of Internal Auditors, 1977.

BUSINESS ADMINISTRATION

Master of Business Administration

In the School of Business Administration

Dr. Madeline Currie, *Director, Graduate Programs*

Graduate Programs Committee

Dr. Madeline Currie, *Chair*

Management and Human Resources

John K. Cheever

Accounting

Peter Dawson

Management and Human Resources

Ronald W. Eaves

Computer Information Systems

Patricia Hopkins

Marketing Management

Samuel Njuguna

Finance, Real Estate and Law

Charles E. Pinkus

Operations Management

The Master of Business Administration curriculum is designed to provide a two-year program of broad professional development. The objectives are to develop a better understanding of the role of the professional manager and the responsibilities within the firm and society; to assist the student in developing a critical approach to decision making and the ability to speak and write effectively and professionally; to develop skill in interpersonal relations; to develop a sound theoretical understanding of organizations and a management perspective for considering problems and making decisions from the viewpoint of the entire firm, industry, and economy; to develop an increased understanding and awareness of the world in which the individual lives; and to develop the capability of acquiring additional education alone. *GBA classes are not open to non-objective, post-baccalaureate (3100) students.*

Admission to the Program and Requirements

After a prospective student has submitted the application for admission to the MBA program to the Office of Admission, the procedure will be as follows:

1. Admission to the MBA program will be granted on recommendation of the School of Business Administration Graduate Programs Committee to the school dean. Selection will be on the basis of evidence of ability to perform at a high academic level. Minimum requirements for admission to the program are a total of at least 1,000 points based on the formula: 200 times the undergraduate GPA (4.0 system) from an accredited college or university plus the GMAT score; or a least 1,050 points based on the formula: 200 times the upper division GPA (4.0 system) from an accredited college or university plus the GMAT score. In addition, a minimum GMAT score of 400 will be required for admission. Exceptions may be granted on petition of the applicant, recommendation of the Graduate Programs Committee, and approval by the school dean.
2. A TOEFL score of 550 or better is required for admission of foreign students to the program.
3. The Dean of the School of Business Administration will notify applicants of their selection or rejection.
4. The Graduate Programs Director will serve as adviser to all selected applicants.
5. First-year program courses may be waived if equivalent courses have been successfully completed by the student. Waiver will be granted on recommendation of the Director and approval of the Graduate Programs Committee.
6. Transfer credits not exceeding thirteen quarter units completed in a graduate school of an accredited college or university may be accepted for second-year program courses upon recommendation of the Director and approval of the Graduate Programs Committee.
7. An advisory program study worksheet for the guidance of the student will be prepared by the Graduate Programs Director when the student is admitted to the MBA degree program. An official degree program will be finalized prior to the completion of the second quarter. It will be approved by the Graduate Programs Director and verified by the Dean of Graduate Studies.
8. A grade-point average of B (3.0) or better must be maintained in all course work taken to satisfy degree requirements and in all graduate-level course work taken at this university.
9. Students will be required to complete all 500-level courses before enrolling in 600-level courses.

Curriculum

First Year

	Units				
GBA 510	Financial Accounting.....	4	GBA 591	Systems Approach.....	4
GBA 511	Managerial Accounting.....	4	HST 510	History of American	
GBA 517	Marketing Strategy	4		Business	4
GBA 519	Survey of Data Processing.....	4	GBA 617	Industrial Dynamics	4
GBA 530	Legal Environment of Business	4	GBA 625	Support Systems	
GBA 532	Managerial Statistics	4		Administration	4
GBA 534	Management Science	4	GBA 626	Instructional Development	
GBA 535	Management Principles			for Business	4
	and Policies	4	GBA 627	Organizational Communications	4
GBA 546	Fundamentals of Financial		GBA 633	Marketing Information	
	Management	4		and Communications	
				Systems	4
	Total, First Year	36	GBA 635	Motivation and Marketing	
				Behavior	4
			GBA 647	Security Analysis and	
				Portfolio Management	4
			GBA 649	Working Capital Management.....	4
			GBA 659	Seminar in Current Accounting	
				Theory	4
			GBA 675	Theory of Organizations.....	4
			GBA 689	Financial Reporting and	
				Communication	4
			GBA 692	Independent study.....	4

Second Year

Required Courses

EC 521	Business Economics	4
GBA 551	Accounting for Executive	
	Administration	4
GBA 561	Seminar in Organizational Behavior	4
GBA 564	Advanced Management Science.....	4
GBA 643	Management Information Systems	4
GBA 646	Advanced Financial Management.....	4
GBA 652	Marketing Seminar	4
GBA 671	Management Seminar	4
	Sub-total	32

Elective Courses

Eight elective units may be selected from:

GBA 560	Legal Environment of Information	
	Systems.....	4
GBA 563	Executive Development	4
GBA 577	Advanced EDP Auditing.....	4
GBA 578	Security and Privacy of	
	Information Systems	4

GBA 691	Directed Study in Business, and	4
GBA 695	Business Research Project (or)	
GBA 696	Thesis	4
(OR)		
GBA 610	Management Policies and Strategies	
	Practicum, and.....	4
GBA 627	Organizational Communication.....	4
	Total, Second Year	48

With consent of the Graduate Programs Director up to 8 units of approved 400-level courses in business or economics may be selected as electives.

Required Electives

Eight elective units will be chosen from the following options:

The Career MBA Program

The Career MBA Program is designed for those students who wish to specialize in a particular area of the curriculum. The set of courses selected as a concentration will be developed by the student and the appropriate department chair with the approval of the Graduate Director.

The program consists of 48 units of coursework that will insure competence in management, in technical skills, and in human relations. Forty units will be chosen from among present required and elective MBA courses. Eight units must be selected that meet the terminal requirement. The student's formal study program must be approved and on file in the graduate office before beginning the Career MBA Program.

CURRICULUM

First Year

	Units	
GBA 510	Financial Accounting.....	4
GBA 511	Managerial Accounting.....	4
GBA 517	Marketing Strategy	4
GBA 519	Survey of Data Processing.....	4
GBA 530	Legal Environment of Business	4
GBA 532	Managerial Statistics	4
GBA 534	Management Science	4
GBA 535	Management Principles	
	and Policies	4
GBA 546	Fundamentals of Financial	
	Management	4
	Total, First Year	36

Second Year—Career MBA Program

Forty units may be selected from:

EC 521	Business Economics	4
GBA 551	Accounting for Executive	
	Administration	4
GBA 560	Legal Environment of	
	Information Systems	4
GBA 561	Seminar in Organizational	
	Behavior	4
GBA 563	Executive Development	4
GBA 564	Advanced Management Science.....	4
GBA 577	Advanced EDP Auditing.....	4
GBA 578	Security and Privacy of	
	Information Systems	4
GBA 591	Systems Approach.....	4
GBA 617	Industrial Dynamics	4
GBA 625	Support Systems Administration	4
GBA 626	Instructional Development	
	for Business	4

GBA 627	Organizational Communication.....	4
GBA 633	Marketing Information and Communication Systems	4
GBA 635	Motivation and Marketing Behavior	4
GBA 643	Management Information Systems	4
GBA 646	Advanced Financial Management.....	4
GBA 647	Security Analysis and Portfolio Management	4
GBA 649	Working Capital Management.....	4
GBA 652	Marketing Seminar	4
GBA 659	Seminar in Current Accounting Theory	4
GBA 671	Management Seminar.....	4
GBA 675	Theory of Organizations.....	4
GBA 689	Financial Reporting and Communication	4
GBA 692	Independent Study	(1-4)
HST 510	History of American Business	4

With the approval of the Graduate Programs Director, up to 12 units may be selected from approved 400-, 500-, and 600-level courses such as business or economics.

Required Electives

Eight elective units will be chosen from the following options:

GBA 691	Directed Study in Business, and	4
GBA 695	Business Research Project or	
GBA 696	Thesis	4
or		
GBA 610	Management Policies and Strategies Practicum, and.....	4
GBA 627	Organizational Communication.....	4
	Total, Second year	48

Master of Science in Business Administration

In the School of Business Administration

The School of Business Administration offers a Master of Science in Business Administration for the student with a business degree who wishes to specialize in a concentrated area of coursework. The option in Business Education is intended primarily for individuals with an interest in teaching business subjects. The option in Electronic Data Processing Auditing is intended for students who wish to pursue a career in EDP Auditing.

ADMISSION TO THE PROGRAM

1. Admission to the MSBA program will be granted on recommendation of the School of Business Administration Graduate Programs Committee to the school dean. Selection will be on the basis of evidence of ability to perform at a high academic level. An applicant shall have a bachelor's degree in business or a related field from an accredited college or university, have a total of at least 1,000 points based on the formula: 200 times the undergraduate GPA (4.0 system) plus the GMAT score, or at least 1,050 points based on the formula: 200 times the upper division GPA (4.0 system) plus the GMAT score. In addition, a minimum GMAT score of 400 will be required for admission.
2. A TOEFL score of 550 or better is required for admission of foreign students to the program.
3. The Dean of the School of Business Administration will notify applicants of their selection or rejection.
4. An advisory study worksheet will be prepared by the advisor for the program for the guidance of the student. During the second quarter of attendance and prior to the student's advancement to candidacy, an official degree program will be prepared. It will be approved by the Director of Graduate Programs and verified by the Dean of Graduate Studies.

REQUIREMENTS

1. The degree program must include a minimum of 45 quarter units. Transfer credits not exceeding thirteen quarter units completed in a graduate school of an accredited college or university may be accepted upon approval of the Graduate Programs Director.
2. A grade-point average of B (3.0) or better must be maintained in all course work taken to satisfy degree requirements and in all graduate-level course work taken at this University.
3. The candidate must fulfill the terminal requirement of a research project, thesis, or comprehensive examination.

MASTER OF SCIENCE IN BUSINESS ADMINISTRATION (Option in Business Education)

The MSBA in Business Education is intended primarily for individuals with an interest in teaching business subjects in secondary schools, community colleges, or four-year colleges. The objectives of the program are:

- To develop an understanding of the role and scope of business education and its relationship to the total educational program;
- To develop the ability to read, interpret, and conduct research in business education;
- To prepare students for secondary, community college, and college positions as professional classroom teachers, supervisors of instruction, and department heads;
- To prepare students to teach in or supervise a business education program in a business college, an adult education school, or in the training department of a business firm; and
- To provide the necessary background for doctoral study and for continued, self-directed study.

CURRICULUM

The program of study for the MSBA in Business Education will consist of 24 required units and 21 approved elective units.

REQUIRED COURSES

GBA 540	Foundations of Business Education	4
GBA 541	Review of Research in Business Education	4
GBA 550	Seminar in Business Education	4
GBA 625	Support Systems Administration	4
GBA 626	Instructional Development for Business	4
GBA 627	Organizational Communications	4
	Sub-total	24

ELECTIVE COURSES

With the approval of the Graduate Programs Director, up to 17 units may be selected from approved 400-, 500-, and 600-level courses in business, economics, or teacher preparation.

DIRECTED ELECTIVES

As a terminal requirement, four elective units will be chosen from among the following options:

GBA 691	Directed Study (and) Comprehensive Examination (0 units)	4
GBA 695	Business Research Project	4
GBA 696	Thesis	4
	TOTAL	45

MASTER OF SCIENCE IN BUSINESS ADMINISTRATION (Option in EDP Auditing)

The MSBA in Electronic Data Processing Auditing is intended primarily for individuals with an interest in pursuing a career in EDP auditing. Also, the program is for business decision-makers, information systems technical specialists, information systems managers, and professionals in accounting, EDP auditing, and other disciplines who wish to develop a better awareness of this field and how it can assist their organization. The objectives of the program are to develop the ability to plan and conduct audits of the EDP function, to develop the capability of reporting to management the findings reached, to prepare students for careers in the EDP Auditing profession; and to provide the necessary background for doctoral study and continued, self-directed study.

CURRICULUM

Due to the technical orientation of the EDP Auditing Option, a strong background in accounting and information systems is required. Before a student can be formally admitted to the graduate program, the following courses or their equivalents must be completed:

REQUIREMENTS FOR ADMISSION TO THE PROGRAM

	Undergraduate Quarter Units	
ACC 301	Intermediate Accounting	4
ACC 302	Intermediate Accounting	4
ACC 303	Intermediate Accounting	4
CIS 315	Structured Systems Design	4
CIS 324	Database Program Development	4
ACC 419	Auditing Principles	4
CIS 433	EDP Auditing	4
	Total	28

The program of study for the MSBA in EDP Auditing will consist of 32 required units and 13 approved elective units.

REQUIRED COURSES

GBA 551	Accounting for Executive Administration	4
GBA 560	Legal Environment of Information Systems	4
GBA 561	Seminar in Organizational Behavior	4

GBA 564	Advanced Management Science	4
GBA 577	Advanced EDP Auditing	4
GBA 578	Security and Privacy of Information Systems	4
GBA 643	Management Information Systems	4
GBA 695	Business Research Project (or) Thesis	4
GBA 696	Thesis	4
	Sub-total	32

ELECTIVE COURSES

With the approval of the EDP advisor and Graduate Programs Director, a minimum of 13 units are to be selected from the following list.

ACC 414	Cost Accounting and Budgeting	4
ACC 415	Advanced Costing Techniques	4
ACC 420	Advanced Auditing	4
CIS 434	Comparative Language	4
CIS 435	Advanced Systems Design	4
CIS 457	Distributed Systems	4
CIS 458	Data Processing Management	4
EC 521	Business Economics	4
GBA 692	Independent Study	1-4
	Total	45

Graduate Course Descriptions

GBA 510 Financial Accounting (4)

Accounting principles used in the collection, interpretation, and use of financial data from the standpoints of creditors, investors, and management. Lecture-discussion, 4 hours.

GBA 511 Managerial Accounting (4)

Principles of financial analysis, costing concepts, the interpretation of costed data, and decision making. Lecture-discussion, 4 hours. Prerequisite: GBA 510.

GBA 517 Marketing Strategy (4)

Development of marketing strategy to identify, sense, serve, and satisfy an organization's specific markets and publics. Concepts relating to the analysis, planning, implementation, and control of marketing programs. Lecture-discussion, 4 hours.

GBA 519 Survey of Data Processing (4)

Examination of data processing vocabulary, concepts, and devices. Introduction to computer programming in batch and time-sharing modes using the FORTRAN language. Tools and techniques of systems analysis. Lecture-discussion, 4 hours.

GBA 530 Legal Environment of Business (4)

Analysis of the essential legal aspects of the business environment dealing with contracts, business-related torts, agency, employment law, and corporations. Function and operation of the courts and administrative agencies. Risk analysis and preventative law approach. Lecture-discussion, 4 hours.

GBA 532 Managerial Statistics (4)

Decision making using classical techniques, non-parameter tests, Bayesian analysis, utility theory, index numbers, and time-series analysis. Sampling and sampling distributions, estimation, hypothesis testing, variance analysis, regression, correlation and multiple regression. Lecture-discussion, 4 hours.

GBA 534 Management Science (4)

Quantitative tools for management decision making. Mathematical techniques of matrix algebra and linear programming applied to business problems. Introduction to games and strategies, Markov chains, and queuing problems. Lecture-discussion, 4 hours.

GBA 535 Organizational Management, Principles and Behavior (4)

Integration of management functions and behavioral processes as they relate to the operation of total enterprise. Lecture-discussion, case studies, experiential exercises, 4 hours.

GBA 540 Foundations of Business Education (4)

Principles, philosophy, and history of business education. Principles of curriculum development and evaluation; the role and scope of business education and its relationship to the total educational program. Lecture-discussion, 4 hours.

GBA 541 Review of Research in Business Education (4)

Criteria for the evaluation of research in business education. Survey of methods employed in research; review and evaluation of reported research; areas of needed research. Development of a research proposal. Lecture-discussion, 4 hours. Prerequisite: GBA 540.

GBA 542 Problems in Business Education (4)

Departmental and classroom problems related to curricula, equipment, guidance, community relations, governmental regulation of programs, and personnel. Lecture-discussion, 4 hours.

GBA 543 Innovations and Trends in Business Education (4)

Study of current trends and innovations in business education on the secondary and collegiate levels. Seminar discussions, demonstrations, observations. Seminar 4 hours. May be taken in two of the following fields:

- a. Bookkeeping and Accounting
- b. Business-Economics Education
- c. Data Processing for Teachers
- d. Distributive Education
- e. Office-Secretarial Subjects

GBA 546 Fundamentals of Financial Management (4)

Theoretical and conceptual framework for financial decision making stressing analytical and quantitative techniques. Analysis of controversial and sophisticated methods of allocating resources and raising funds both internally and externally within the corporate context. Lecture-discussion, 4 hours. Prerequisite: GBA 510.

GBA 550 Seminar in Business Education (4)

Discussion of selected areas in business education. Seminar, 4 hours. Prerequisite: GBA 540 or consent of instructor.

GBA 551 Accounting for Executive Administration (4)

Control systems, responsibility in profit planning and control, capital investment decisions, and federal income tax aspects of decisions. Lecture-discussion. 4 hours. Prerequisite: GBA 511.

GBA 560 Legal Environment of Information Systems (4)

Fundamentals and intermediate knowledge of the legal environment concerning EDP. Typical legal problems arising from the acquisition, use and control of EDP. 4 lectures. Prerequisites: CIS 433 and GBA 530.

GBA 561 Seminar in Organizational Behavior (4)

Human processes employed in accomplishing work tasks and creating employee satisfaction within the organization. Group experiences whereby students test their interpersonal skills in the organizational environment. Group activities, lecture discussion, 4 hours.

GBA 563 Executive Development (4)

Analysis of the factors endemic to the successful executive and how these skills and traits can be acquired. Seminar, 4 hours. Prerequisite: GBA 561.

GBA 564 Advanced Management Science (4)

Quantitative theory and techniques. Linear, integer, non-linear, and dynamic programming, transportation and assignment algorithms, replacement problems, game theory and Markov processes; introduction to computer solutions. Lecture-discussion 4 hours. To be taken during first quarter of the second year of the MBA program. Prerequisite: GBA 534.

GBA 577 Advanced EDP Auditing (4)

Hands on experience in applying EDP Auditing techniques and methods. Fundamentals of advanced concepts in EDP Auditing. 4 lectures and projects. Prerequisites: CIS 433 or equivalent experience.

GBA 578 Security and Privacy of Information Systems (4)

Practical case-study approach to solving security problems peculiar to the commercial data systems environment. 4 lectures. Prerequisite: CIS 433.

GBA 591 Systems Approach (4)

Analysis of business systems from a systems approach. Information gathering, analysis, design, and implementation of effective systems. Analysis and critique of alternative approaches to solution of practical management problems. Lecture-discussion, 4 hours.

GBA 610 Management Policies and Strategies Practicum (4)

Experience in the making of business policy and developing competitive strategies at the top management level. Computer-based simulation, 4-hours. This course, when combined with GBA 627 Organizational Communication, may be substituted for courses GBA 691 Directed Study in Business and GBA 695 Business Research Project (or GBA 696 Thesis) in the MBA core curriculum.

GBA 617 Industrial Dynamics (4)

Interaction of supervisors and employees within the social system of the plant. Resolutions of problems and tensions through communication. First-line supervisor as a member of management. The union, collective bargaining, and arbitration. Labor legislation. Cultural differences as they affect group dynamics. Lecture-discussion, 4 hours.

GBA 625 Support Systems Administration (4)

Support activities and services provided by management support personnel including: support systems organization and management; records systems; procedures analysis, simplification and improvement; support personnel selection, utilization and management; employee productivity assessment; communications and forms management, offices planning and environment; work station and equipment considerations. Lecture-discussion, 4 hours.

GBA 626 Instructional Development for Business

The development of instructional strategies for business education and training programs. Appraisal of innovative educational programs. Examination of career paths in higher education for business. Seminar (4 hours).

GBA 627 Organizational Communication (4)

Developing communication skills in the transmission and reception of information, written and oral; becoming familiar with the organizational literature; practicing communication skills in small groups; reviewing writing practices and procedures and the approved style manual. Lecture-discussion, 4 hours.

This course, when combined with GBA 610 Management Policies and Strategies Practicum, may be substituted for courses GBA 691 Directed Study in Business and GBA 695 Business Research Project (or GBA 696 Thesis) in the MBA core curriculum.

GBA 633 Marketing Information and Communications Systems (4)

Generation and analysis of marketing information. Research, theory and methods of market stimulation and mass communications. Use of marketing information in communications to all of the firm's publics, with emphasis on the consumer. Lecture-discussion, 4 hours. Prerequisite: GBA 517.

GBA 635 Motivation and Market Behavior (4)

Theory and application of the findings of the behavioral sciences to the ultimate consumer in a relatively affluent society to give the decision maker effective bases for making and implementing product, price, promotion, distribution and public policy. Lecture-discussion, 4 hours. Prerequisite: GBA 517.

GBA 643 Management Information Systems (4)

Analysis of the problems involved in the design of automated systems to provide managers with the accurate, timely, and adequate information required for decision making. Lecture-discussion, 4 hours. Prerequisite: GBA 519.

GBA 646 Advanced Financial Management (4)

Fundamental issues of financial management; short-term asset management; evaluation of long-term assets, capital structure models, and sources of capital. Lecture-discussion, 4 hours. Prerequisites: GBA 564 and EC 521.

GBA 647 Security Analysis and Portfolio Management (4)

The three major types of investment analysis: fundamental, technical and random walk, with emphasis on the fundamental approach to valuation and stock selection. Portfolio analysis, composition, selection, revision and performance. Two-parameter, risk and return models, such as the capital asset pricing model and the capital market line. Seminar, 4 hours. Prerequisite: GBA 546.

GBA 649 Working Capital Management (4)

Discussion and evaluation of techniques for managing inventory, accounts receivable and liquid reserves. Analyses of short-term planning models using linear programming. Prerequisites: GBA 534 and 546.

GBA 652 Marketing Seminar (4)

Marketing decision making. Application of marketing concepts and implementation of effective marketing programs. Analysis of marketing decision-making techniques. Present and future marketing trends. Lecture-discussion, 4 hours. Prerequisite: GBA 517.

GBA 659 Seminar in Current Accounting Theory (4)

Evolution of accounting theory. Current problems, reasons, and causes for controversy, and future developments. Seminar, 4 hours. Prerequisite: GBA 551.

GBA 671 Management Seminar (4)

The development and evaluation of alternative corporate strategies, drawing upon the functional areas within business and the outside environmental factors which affect business. Seminar, 4 hours. Prerequisite: GBA 561.

GBA 675 Theory of Organizations (4)

Analysis of organizations from a theoretical and structural point of view. Current research in organization dynamics and development from a multidisciplinary perspective. Seminar 4 hours. Prerequisite: GBA 535.

GBA 689 Financial Reporting and Communication (4)

Application of selected theory concepts in model construction. The determination of changes in reported operating results arising from changes in accounting theory. Seminar, 4 hours. Prerequisite: GBA 564.

GBA 691 Directed Study in Business (1-4)

Independent, directed study of advanced topics in the field. Individual conferences with the instructor.

GBA 692 Independent Study (1-4)

Individual investigation or original study to be conducted in a field of interest selected by the student with approval of the instructor. Intensive personal research under initiative of the student with general guidance and advice from the instructor. Seminar.

25537

GBA 695 Business Research Project (4)

A written research project concerning a significant problem in the field of business. Prerequisite: GBA 691 for MBA candidates. GBA 541 for MS candidates in Business Education.

GBA 696 Thesis (4)

A formal thesis concerning a significant problem in the field of business. Prerequisite: GBA 691 for MBA candidates. GBA 541 for MS candidates in Business Education.

GBA 699 Master's Degree Continuation (0)

Registration required in any quarter following final assignment of SP in continuing work in which student intends to use facilities of the university. Registration permitted instead of leave of absence when student plans to use university facilities. The student must be enrolled in the university during the quarter in which he/she graduates.