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EDP AUDIT CAREER PATHS

BY

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GAO EVALUATOR - Los Angeles Regional Office

U.S. General Accounting Office

017302

EDP Auditing in the Federal Environment-Con't.

EDP AUDIT CAREER PATHS

Monday, June 22, 10:15 to 11:30 a.m.

or

Tuesday, June 23, 10:15 to 11:30 a.m.

Frederick Gallegos, *Supervisory Management Analyst, General Accounting Office.*

This presentation will focus on the training and career paths for the EDP auditor. Mr. Gallegos will discuss recent training and career development programs both within and outside of the General Accounting Office. Consideration will be given to the How an organization can design and develop its own career development program. What needs to be done? How to start? How to obtain support? Specific approaches for the identification of skill levels, selection of training programs and the conceptualization and formalization of a training/career development program will be covered.

Mr. Gallegos' primary function within the General Accounting Office is to research program and agency policies, audit management operations and report to interested members of Congress. He assisted in the design, development and implementation of an agency-wide data processing training program. Gallegos was a prime mover in the development and implementation of an M.S. program in EDP Auditing at California Polytechnic University at Pomona.

IMPLEMENTATION OF A/71 GUIDELINES FOR FEDERAL SYSTEMS

Tuesday, June 23, 4:30 to 5:30 p.m.

Panel Discussion

This panel discussion will review the requirements necessary to prepare to meet the needs of A/71.

The panel will consist of:

Edward Springer, Office of Management of the Budget
Robert Abbot, EDP Audit Controls, Inc.
Peter Browne, Computer Resource Controls
Joseph Sickon, U.S. Department of Housing and Urban Development

Participants of the conference are invited to present their views and bring questions to the panel.

ORGANIZING AND MANAGING THE EDP AUDIT FUNCTION IN A FEDERAL DEPARTMENT

Wednesday, June 24, 10:15 to 11:30 a.m.

Joseph A. Sickon, *Assistant Inspector General, U.S. Department of Housing and Urban Development*

This session describes computer auditing in a major Federal Department. Mr. Sickon addresses organization and staffing of the EDP audit function along with planning, reporting and following up on audit findings. He also discusses the impact of the Inspector General Act of 1978 and compliance with GAO Audit Standards and OMB Circulars.

Sickon is responsible for planning, conducting, supervising and coordinating audit activities related to programs and operations of the Department. He supervises audit and related efforts of about 350 audit and clerical personnel in headquarters and in the field.

A former Director of Procurement and ADP Management with the U.S. Department of Commerce, Mr. Sickon also served as Director of Audits for that Department, following a number of years in the audit and financial management of the Maritime Administration, Department of Commerce.



Frederick Gallegos



Joseph A. Sickon



Lee F. Haynes



Roldan Fernandez

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

CALIFORNIA STATE POLYTECHNIC UNIVERSITY, POMONA

THE NEED FOR A BETTER TRAINED EDP AUDITOR

Although the basic concepts of EDP Auditing have been around since the 1960'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 \$780,000, 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 skrink 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.

WHAT STEPS ARE BEING TAKEN NOW TO TRAIN THE IS AUDITOR

The total awareness of the skills needed to develop a capable information systems auditor of the future are largely undefined at this time. Our society has approached this need in a fragmented order. Several steps in assessing these skills have been undertaken by various professional societies, educational institutions, government agencies and Big "8" Audit Firms. These efforts have been largely fragmented and lacking in coordination and cohesiveness. There results have been very good in some areas considering the above and extremely weak in other areas.

Professional Societies

Among the professional societies who have contributed to the advancement and awareness of the EDP Audit role in the organization are the American Institute of Certified Public Accountants, Institute of Internal Auditors and the EDP Auditor's Association and the EDP Auditor's Foundation for Education and Research.

CAREER PATHS FOR THE EDP AUDITOR

DIRECTOR OF AUDITING

AUDIT MANAGER - EDP AUDITING

SENIOR EDP AUDITOR

EDP AUDITOR

EDP AUDITOR TRAINEE

INFORMATION SYSTEMS

ACCOUNTING / BUDGETING

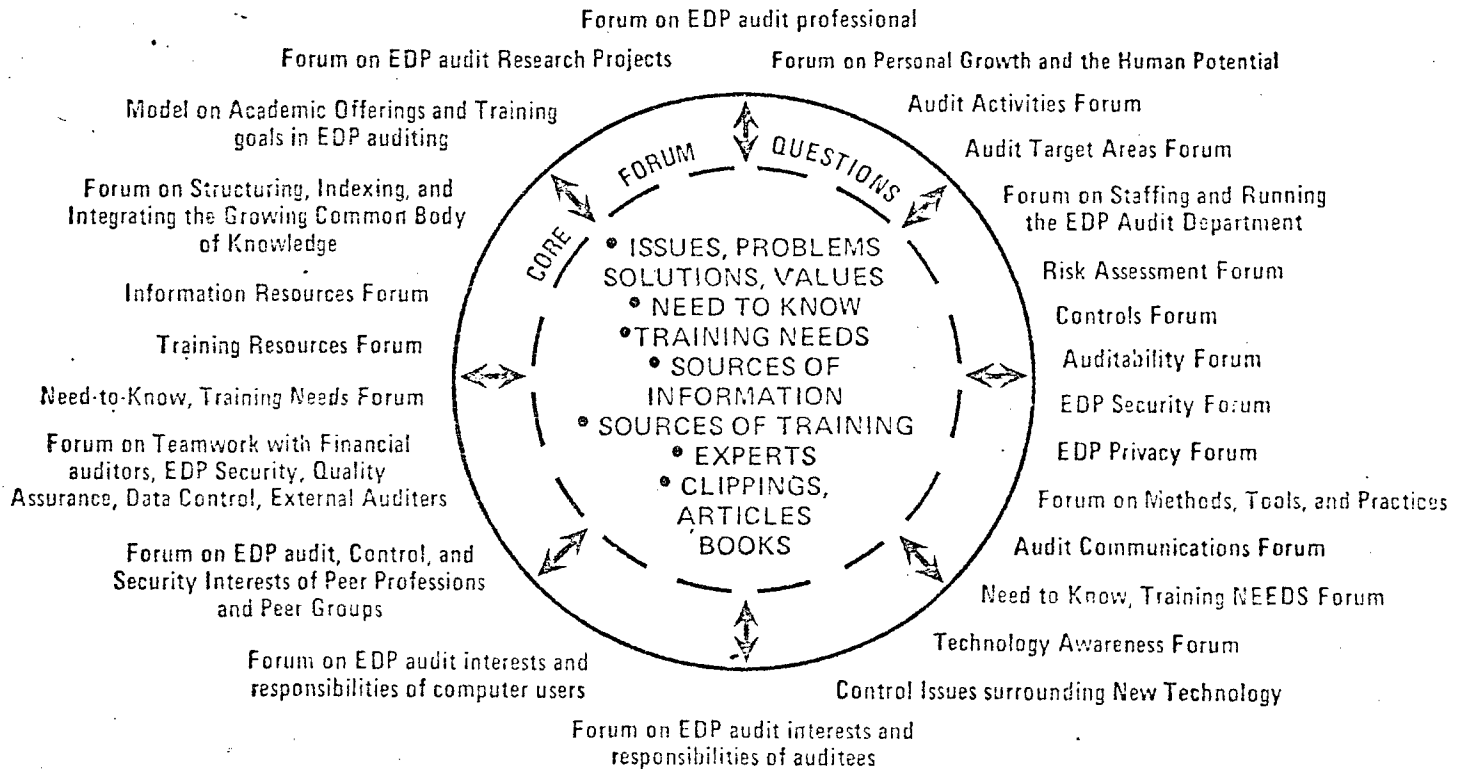
LINE MANAGEMENT

CORPORATE MANAGEMENT

CONSULTING

IDENTIFICATION OF SKILL LEVELS

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



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 tele-communications 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.

TRAINING REQUIREMENTS AND KNOWLEDGE LEVELS

ADP TRAINING

ADP TRAINING REQUIREMENTS

KNOWLEDGE LEVELS

*EDP
Auditor*

	Basic		Advanced ADP Qualified Auditor	Specialist
	Directorate & Managers	Audit Staff		
1. General knowledge of ADP systems	C	C	P	S
2. Data audit retrieval systems	C	C/S ¹	P	S
3. Remote terminal operation	C	C/S ¹	P	S
4. Internal controls	C	C	P	S
5. ADP accounting systems	C	C	P	S
6. Other functional area ADP systems	C	C/S ¹	P	S
7. Management of ADP facilities	C	C	P	S
8. Government-wide impact	C	C	C	S
9. Selection and/or acquisition of ADP system	C	C	P	S

Some members of the audit staff will acquire an advanced capability in a particular skill such as terminal use without necessarily achieving the "ADP qualified" overall advanced audit skills.

C = Concepts, generalized knowledge
 P = Practices, advanced concepts plus knowledge of actual performance and skills
 S = Skills, concepts, practices, plus specialized ability to perform

TRAINING AND CAREER DEVELOPMENT PLAN

GAO EVALUATOR (ADP AUDITOR) CURRICULUM

Advanced Grades 14/15	Advanced Supervision	Program Evaluation	Auditing Tele-communications	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	ADP System Documentation
Entry-Level Grades 5/9	Entry Level Training	Orientation	Base Level ADP-I	Use of Models & OPS Research Techniques	Intro to SPSS & S.A.S.	Statistical Sampling



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: Classroom instruction, group discussion, group exercise.

LENGTH: A 3 day program.

INSTRUCTORS: Office of Personnel Management (OPM)

PRE-REQUISITES: Base level ADP I & II or equivalent knowledge.

RECOMMENDED PARTICIPANTS: ADP Auditors and Computer Specialist/OPS Research

FREQUENCY: Offered 4 times a year.

CLASS SIZE: 20-24 students.

STATUS: Available at \$250 per student.

INTERNAL CONTROLS IN AUTOMATED SYSTEMS

OBJECTIVES: To provide individuals with an overall understanding of ADP 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 in Advanced Systems,
- Data Base Controls, and
- Output Processing.

METHODOLOGY: Approximately 2/3 of the course time is lecture aided by slides. Numerous class exercises which require group discussions and presentations are interspersed.

LENGTH: A 5 day program.

INSTRUCTORS: GAO auditors who have extensive knowledge of ADP internal controls and job experience in auditing internal controls.

PRE-REQUISITES: Base Level ADP I & II or equivalent knowledge.

RECOMMENDED PARTICIPANTS: ADP Auditors and Computer Specialist/OPS Research

FREQUENCY: Offered twice a year.

CLASS SIZE: 12-25 students.

STATUS: Present course under revision.

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 DCD); 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, indexing, subroutines, linkage, fixed position printing and others,
- DYL-AUDIT discussion and use,
- DAS and DCD discussion and use, and
- Class problem using the above techniques.

METHODOLOGY: Video-assisted lecture with hands-on exercise.

LENGTH: A 5 day program.

INSTRUCTORS: Three GAO senior ADP auditors with extensive CAATS experience.

PRE-REQUISITES: All base level, and previous career ladder training, or equivalent knowledge.

RECOMMENDED PARTICIPANTS: ADP Auditors, Computer Specialist/OPS Research

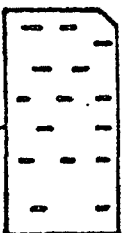
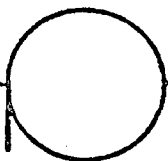
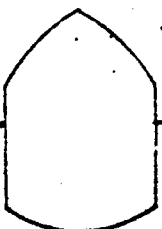
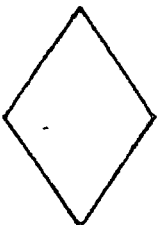
FREQUENCY: Offered twice a year.

CLASS SIZE: 15-18 students.

STATUS: Under development.

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.

GENERAL

BASIC.AUDITORS. Basic ADP Auditing

COMPUTER

INTERMEDIATE.AUDITORS.
ADP Controls & Computer Auditing
Computerized Data Retrieval Packages
System Design & Development
ADP Acquisitions
Computer Security and Privacy
Computer Operation & Performance

SENIOR

ADVANCED.COMPUTER.
AUDITORS
Computer Programming
Computer System Software
Current Computer Technology

AUDIT

EXECUTIVE.SUPERVISORS.
AND
MANAGERS
ADP for Audit Managers

All. Continuing Education

COMPUTER AUDITOR DEVELOPMENT PLAN

CATEGORY	COURSE #	COURSE TITLE	MONTH OFFERED												PREREQUISITES	ACCEPTED
			J	F	M	A	M	J	J	A	S	O	N	D		
BASIC																
INTERMEDIATE																
ADVANCED																

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

EXECUTIVE COURSE

ADP FOR AUDIT MANAGERS

3 days - IATP

Description

The course covers the following topics:

- Transaction processing areas.
 - data collection/input,
 - edits,
 - control over rejects,
 - system output, and
 - data integrity.
- System environment.
- directives, training, user guidance,
 - separation of duties,
 - internal controls,
 - audit trails,
 - interfacing systems, and
 - contingency plans.
- Special processing problems.
- record alteration,
 - unusual transaction processing,
 - processing efficiency,
 - data communication, and
 - data storages.
- System management.
- quality control reports,
 - data errors and deficiencies,
 - system changes, and
 - utilization of computer power.

Audits:

- computer security,
- meeting functional objectives, and
- cost benefit analysis.

Prerequisite

Any basic ADP course.

Objective

The course provides audit managers with an overview of current auditing techniques and tools being used in the ADP environment.

Tuition

\$220 Includes tuition and all course materials.

For further information call (301) 492-6351 or
FTS 8-492-6351.

IX COMPUTER SECURITY AND PRIVACY _____

Provides information on privacy and security in data processing including such topics as legal environment; total system security; environmental, installation, and software security; and cost/benefit analysis.

Security and Privacy of
Computer Systems
Office of Personnel Management

Auditing Security and Privacy
of Computer Systems
Being developed by
Interagency Auditor Training
Programs

IV BASIC ADP AUDITTING

To acquaint the beginning auditor with current day dependence on computers and the impact on auditing. Provides a basic familiarization with the computer, computerized information processing systems and operations, and the concepts and principles associated with auditing such systems.



Introduction to ADP Auditing
Interagency Auditor Training Programs

OR

Auditing Automated Systems
--Tools and Techniques
Office of Personnel Management

BASIC COURSE

AUDITING AUTOMATED SYSTEMS:
TOOLS AND TECHNIQUES

5 days - OPM

Description

The course includes approximately 30 hours of classroom work and 20 hours of work outside of class. The following subjects are developed through lectures, group discussions, and individual and team workshops:

- ADP equipment (capabilities, characteristics, and controls required),
- flowcharting (preparation, understanding, and use as an audit tool),
- computer programming (program development, operation, and program control),
- internal controls and audit trails in other than real-time environments, and
- audit techniques and their application.

Prerequisite

Any basic ADP course.

Objective

The course provides fundamental knowledge and training in ADP auditing.

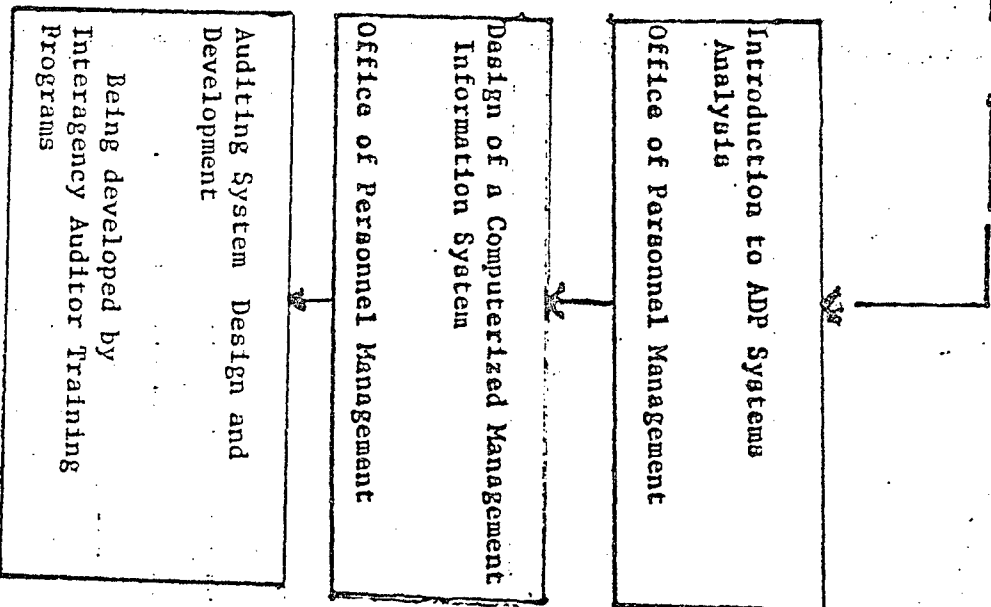
Tuition

Washington, D.C.--\$350.00 includes all tuition and course materials.

Other locations--Call appropriate number in Appendix I.

VIII SYSTEM DESIGN AND DEVELOPMENT

- To help ensure the accuracy and reliability of computer application systems, the scope of auditing is increasing to include controls over the system design and development process. These courses are designed to help the auditor evaluate and determine whether
- adequate application controls are installed,
 - user requirements are satisfied,
 - cost benefits and improvements are realized,
 - acceptance testing is adequate, and
 - projects are completed within cost budgets and time schedules.



VIII ADP ACQUISITIONS

Provides information on the computer acquisition cycle, types of contracts, relevant laws, regulations and guidelines, competitive selection versus sole source, and third party leasing in the Federal Government.

Seminar in Computer System Evaluation and Selection
Office of Personnel Management

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
3801 West Temple Avenue
Pomona, California 91768

Master of Science in Business Administration Electronic Data Processing Auditing Option

Dr. Madeline Currie, Director, Graduate Programs
Dr. Ronald Eaves, Advisor, EDP Auditing Option

Graduate Programs Committee

Dr. Madeline Currie, Chairperson

Peter Dawson, Human Resources & Small Business Management
Ronald Eaves, Information Systems
Hyung-Ki Jin, Finance, Insurance & Real Estate
Morcos Massoud, Accounting
Charles Pinkus, Management Science & Production
Anthony Reed, Marketing Management

THE CAMPUS

California State Polytechnic University, Pomona is located south of the San Bernardino Freeway on the eastern slope of Kellogg Hill. Cal Poly is at the hub of an important transportation network. Adjacent to the San Bernardino Freeway, the campus is 40 minutes from downtown Los Angeles. The University will be convenient for travelers on the Pomona, Foothill, Corona, and Orange Freeways.

Cal Poly is a coeducational institution with an enrollment of over 15,500. It is one of 19 campuses of the California State Universities and Colleges system. Seven departments comprise the School of Business Administration: accounting; management; information systems; finance, insurance and real estate; marketing management; and hotel and restaurant management.

ACCREDITATION

The university is accredited as a degree-granting institution by the Western Association of Schools and Colleges.

from an accredited college or university plus the GMAT score; or at 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. Applicants with bachelor's or graduate degrees other than in business will require evaluation for the necessary equivalent courses to be taken.

2. The Dean of the School of Business Administration will notify applicants of their selection or rejection.
3. The EDP Auditing Program Advisor will serve as advisor to all selected applicants.
4. An advisory program study worksheet for guidance of the student will be prepared by the Advisor of EDP Auditing Program upon admission to the program. An official degree program will be finalized prior to the student's advancement to candidacy. It will be approved by the Director of Graduate Programs and the Dean of Graduate Studies.
5. 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 both Director of Graduate Programs and Advisor of EDP Auditing Program.
6. A grade point average of "B" (3.0) or better must be maintained in all course work attempted to satisfy the degree requirements and in all upper division and graduate level course work attempted at this university.
7. Foreign students must have a TOEFL score of 550 or better.

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:

<u>Requirements for Admission to the Program</u>		<u>Undergraduate Quarter Units</u>
ACC 301	Intermediate Accounting	4
ACC 302	Intermediate Accounting	4
ACC 303	Intermediate Accounting	4
IS 314	Data Management Concepts	4
IS 315	Systems Design	4
ACC 419	Auditing Principles	4
IS 433	EDP Auditing	4
Total		28

PLACEMENT

Many representatives from business, industry, and government recruit annually through the University Career Planning and Placement Center. Faculty members are often of additional assistance in placing students.

If you have any questions not answered in these pages, write to:

Graduate Program Advisor - EDP Auditing
School of Business Administration
California State Polytechnic University, Pomona
3801 West Temple Avenue
Pomona, California 91768

or phone (714) 598-4214 for an appointment.

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. To be taken in last quarter of the MBA program. 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 Accounting Research (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.

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.

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.

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.

Upper-division courses applicable to the master's degree will be found in the section of this catalog describing undergraduate courses in the School of Business Administration.

BUSINESS ADMINISTRATION

- 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: GBA 530 and IS 433.

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 Quantitative Business Analysis (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. Prerequisite: IS 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: IS 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 or other approved writing course, may be substituted for course GBA 691 Directed Study in Business and GBA 695 Business Research Project (or GBA 696 Thesis) in the MBA core curriculum.

DPMA MODEL CURRICULUM

CIS - 12

EDP AUDITING

CIS-12 EDP AUDIT AND CONTROLS

Course Level: Senior

Prerequisite: CIS-6 Data Base Program Development and at least one Audit or Managerial level course in Accounting

Course Description: An introduction to the fundamentals of EDP Auditing. Emphasis on understanding EDP controls the types of EDP Audits, concepts and techniques used in EDP Audits. Exposure to risk assessment and professional standards in the field of EDP Auditing.

Course Goal

To develop a basic understanding, awareness, and appreciation of the EDP Audit environment.

Course Objectives

1. To develop an understanding of the EDP Audit environment.
2. To develop an understanding of the importance of EDP controls and the effect poor controls can have within a computer based information system.
3. To develop an understanding and awareness the various kinds of audits which EDP auditors perform in conducting audits of computer based information systems and operations, (i.e., SAS-3 Reviews, Audits of Systems Development, etc.)
4. To develop an understanding and awareness of some of the fundamental and new concepts and techniques used by the EDP auditor (i.e., Extended Records, Risk Assessment)
5. To develop motivation and appreciation for good professional data processing management practices.

Course Content

1. EDP Audit Environment and Computer Based Information Systems (10%)
Skill Level 3

A basic orientation to the EDP Audit environment and its relationship 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 impact upon the business community at large.

2. Information System Controls (25%)
Skill Level 3

Types of Information Systems Controls:

Application controls, System Development controls, Information Processing Facility controls, Horizontal controls vs. Vertical controls. Preventive, Detective and Corrective controls. Controls for security.

3. Computer Audit Techniques (30%)
Skill Level 2

The types of EDP Audits (i.e., Audits of Applications, Audits of Systems Development, Audits of Information Processing Facilities, 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 (i.e., confirmation, comparison with file or physical, edit & reasonableness tests). Discussion of 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.

EDP Audit Applications

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 requirement to design and develop an audit software program to verify results of a business application (General ledger system, payroll, inventory, etc.)

Course Approach

This course is a senior level elective course. As such, it will provide fundamental knowledge of the EDP Audit environment and Process. Although the course requires fundamental knowledge of accounting principles and processes and auditing concepts, they are used in the course to benefit and expand the knowledge of the future 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 IS department. The course will cover EDP Controls and Computer Audit Techniques. The methodology used to introduce the EDP controls and Computer Audit Techniques 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 ample opportunity for students to accomplish two projects during the course which will aid the students' understanding of the EDP Audit environment and expand

their awareness of this field. The first project should be a research paper on an EDP Audit related topic of about 15-20 pages in length. In lieu of this, a Test Data case could be used as a substitute to provide more "hands on" projects. The second project should be a project which requires students to apply some of the concepts and fundamentals learned. Several case studies are presently available which can be used to accomplish this objective. The case study should include an exercise involving the design, development and execution of an audit retrieval language such as TREAT, CARS III, DYL-260, PEARL, MARS, STRATA, etc. If an audit retrieval language is unavailable, then COBOL could be used. If possible, "real world" projects should be used in place of case studies.

The Audits of Advanced Systems will be covered. However, because of the nature and complexity of this area, the presentation and exercises should be kept to an informative rather than a detail level. Included in the discussion of audits of on-line systems are Remote systems (Batch transactions and job entry [RJE], Real-time systems (Inquiry, Update and Programming) and Switching systems (Electronic Funds Transfer, Distributed Systems and Networks). Also, discussion should include the techniques used to approach minicomputer and microcomputer applications.

The final area to be presented involves some of the newer methods or techniques used by auditors and consultants in evaluating the vulnerability of an information processing system to computer abuse and fraud. Two of the current techniques are Risk Assessment and Threat Analysis. Both employ systematic techniques and methodologies in their application. Another area for discussion is the use of cost/benefit analysis in determining the acceptable level of risk.

The teaching methodology for this course should include lecture, discussion, illustration and clarification of the concepts and terminology. The projects suggested are designed to expand the understanding of the EDP Audit Environment and Process, and to allow the development of a minimum level of skill in the application of EDP auditing concepts.

References:

- Texts - (1) Computer Control and Audit
William C. Mair, Donald R. Wood, Keagle W. Davis
- (2) EDP Auditing: Gordon Davis, Schaller, and
Adams
- (3) Controls and Auditing: Second Edition
W. Thomas Porter and William E. Perry
- (4) Computer Control and Audit: A Total Systems
Approach
John C. Burch, Jr., and Joseph L. Sandinas
- Case Studies -
- . Case Studies In Computer Control and Auditing -
Funded by The Touche Ross Foundation (June 1978)
 - . Fedco Case Study - by Frederick Gallegos
U.S. General Accounting Office, Los Angeles
- Publications - EDP Audit, Control & Security Newsletter
- EDP Auditor's Journal
- EDP Auditor's Update
- NBS Publication 500-19 "Audit and Evaluation
of Computer Security"
- Computer Control Objectives - 1980, EDP
Auditors Foundation for Research and Education
- NBS Publication 500-57 Audit and Evaluation
of Computer Security II: Systems Vulnerabilities
and Controls
- Computer Audit Guidelines, Canadian Institute
of Chartered Accountants
- Systems Auditability and Control - Audit
Practices, Institute of Internal Auditors, 1977.
- Management, Control and Audit of Advanced
EDP Systems - AICPA, 1977.