Analysis of Courses in Information Management and Network System Security & Survivability

Peter Capell

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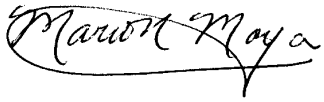

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Abstract

This report provides an overview of instructional systems design and its implications for analyzing curricula in the fields of information management and networked systems longevity. Measurable benchmarks for assessment of training and educational resources are offered in order to fully illustrate how to perform instructional gap analysis. This report also addresses issues of instructional approaches and metrics, performance objectives, educational measurement, and mission vs. learning objectives, and includes a selected listing of related coursework in the appendices.

Acknowledgements

Special thanks to Jennifer Tomal and Barbara Gratz for their support in gathering information related to Network System Security and Survivability. Thanks also to Bob Fantazier for making ideas clearer with illustrations. Thank you to Doug Mosurak for editing and technical review, and thanks to Sally Cunningham, Bob Rosenstein, and Scott Reed for their managerial support throughout this effort.

1 Purpose and Scope of the Study

The purpose of this study is to provide the National Guard Bureau with insight into the quantity and characteristics of its training inventory in courses for three domains: software system acquisition, information technology, and network system security and survivability. The scope of the study has expanded slightly, because the quantity of information sources is much larger for courses in the target domains NSS (Networked Systems Survivability) and IM (Information Management). Therefore, volume two includes courses used by the National Defense University (NDU), Defense Acquisition University (DAU), Carnegie Mellon University, and a commercial course vendor, all of whom provide courses accessible for use by the National Guard Bureau (NGB).

1.1 Information Sources

The following is a brief description of the composition and background information related to the sources of course information provided here:

- National Defense University. NDU Is composed of four colleges: Armed Forces Staff College (AFSC), the Industrial College of the Armed Forces (ICAF), the Information Resources Management College (IRMC), and the National War College. AFSC and ICAF are both senoir colleges. NDU also houses the Institute for National Strategic Studies and the Center for Hemispheric Defense Studies.
- Defense Acquisition University. DAU was established by Congress in 1990 to consolidate and integrate education and training for more than 110,000 people in the Defense Acquisition Workforce. Consortium member schools provide more than 85 acquisition courses to entry, intermediate, and senior level civilian and uniformed personnel to allow them to attain certification in one or more of the 11 defense acquisition career fields. Courses are developed and delivered by 12 DoD educational institutions and by contractors to DAU.
- Carnegie Mellon University. One of the premier technical universities worldwide, Carnegie Mellon was among the original ARPAnet (Internet) sites in the nation, having approximately 6000 Internet address nodes in 1985. Carnegie Mellon was also instrumental in the development of cross-platform network-based computing, and founder of the original CERT/CC®[1] concept housed within the Software Engineering Institute (SEI). Carnegie Mellon offers courses on information management and network security through its Heinz School, and the SEI that provide students access to some of the longest-running real-world experience in system configuration and in network systems security.

[1] CERT/CC is registered in the U.S. Patent & Trademark Office.

- Gartner Group (commercial vendor). Gartner Group was selected because of its many offerings provided for distance education usage in the target domains. Gartner Group is a leading authority on information technology (IT), having expertise in IT research, decision support, analysis, measurement, consulting and training. Gartner Group advertizes that they have 33,000 individual clients, representing over 9,000 located in 49 countries.

2 Context Review

2.1 "How-To-Do" and "What-To-Do"

The attributes "how-to-do" and "what-to-do" are used in this study to describe the character of courses in two domains: information management (IM), and network system security and survivability (NSS). These attributes were assigned as high-level indicators to assess the suitability of a course for use in distance education. In Volume 1 of this report, however, this idea was identified as being somewhat misleading, in that a distance-educational approach does not constrain the form of design or implementation used in a course. In fact, virtually any course content that could otherwise be televised *can* be used for distance education. The question of how-to-do and what-do-do therefore, becomes one that should identify which of these general modes of delivery is appropriate to the varying needs of varying audience types, and varying mission objectives. The definitions of the terms how-to-do and what-to-do where therefore refined and redefined, since either a how-to-do or a what-to-do course may be disseminated using distance-education technology. It so happens that distance education and the growth of the influence of digital technology has caused a re-evaluation of instructional approaches, and for the purposes of this report, how-to-do and what-to-do are used as a means of distinguishing course intentions and designs. With clarification as to the application of courses to specified needs, reviewers of this study will have a way to assess how courses may fit their needs for distance education and other purposes as well. Even with elaborations on the definitions of these educational styles, it is probably simplest to characterize how-to-do and what-to-do in the following general way:

- *How-to-do* courses can be thought of as being primarily *performance enhancing*.
- *What-to-do* can be thought of as *enrichment*.

This distinction is given more definition later in this volume. There is no judgment implied as to the value of either approach, and clearly some use of both approaches is useful as determined by the contexts for which the educational experience is created.

2.1.1 Effective Instruction and Effective Design

How-to-do and what-to-do are reasonable phrases with which to characterize courses because, as labels, they summarize two extremes of instructional approach *from the learner's perspective*—one approach (what-to-do) is primarily passive in nature and the other active. At one extreme, what-to-do courses provide information that *may* be actively employed after instruction. At the other extreme, how-to-do courses provide information that provides activity within the course offering, and is *fully intended* for application after instruction. The how-

to-do label also alludes to at least one undeniable finding from more than forty years of educational research—people learn most effectively by *doing*.

2.1.1.1 Some Elements of Effective Design

How-to-do and what-to-do also highlight *the* essential difference among courses—the quality of course *design*. Because both "what" and "how" are necessary components in creating effective instruction, the integration of "what" and "how" is at the heart of effective instructional techniques. What is instructional effectiveness? For the purposes of this report, instructional effectiveness is defined as the degree to which a planned, educational experience is remembered and usable in a job role.

2.1.1.2 Examples of Enabling Education Principles

Two hallmark instructional characteristics best characterize how-to-do instruction; first is the *learning by doing* principle, and second is the *situated learning* approach to instruction. Although these are only two among many factors that affect instructional outcomes, they are nonetheless critical factors in that their effects on instructional effectiveness have been well documented and widely accepted by educational development specialists.

The *learning-by-doing* principle is central to modern instructional approaches, where skills transfer is essential. This principle is the source of such catchy educational thumb rules such as the often-cited aphorism.

People generally remember…

- 20 percent of what they *hear*
- 30 percent of what they *see*
- 50 percent of what they *hear* and *see*
- 85 percent of what they *hear, see,* and *do*

2.2 Instructional Strategies and Learning

Although the percentages given in the aphorism are general, they do speak to the verifiable precept that to increase the *passivity* of an instructional experience is to reduce the likelihood that information will be remembered and hence, used. On the other hand, increasing *activity* in an experience increases the probability of remembering and potentially applying skills and knowledge.

Situated instructional approaches have been applied for years[2] in order to incorporate the aspects of real-world environments into instruction. The underlying notion behind this approach is that "the best preparation for an event is the event itself." Situated learning ap-

[2] Ausubel, David.

proximates the environment where knowledge will be applied in order to increase the likelihood of skills transfer. One example, electronic performance support systems (EPSS), represent a relatively new technological application of this principal to *situating* the knowledge needed to use certain software programs directly into the environment of their use. Other applications of situated learning would be flight or tank simulation in military training or cadaver research in anatomical research training.

2.3 Formative and Summative Evaluations

Of course the notion of instructional effectiveness has to be tempered with the wisdom that unintended information and poor performance can be very effectively conveyed using sound instructional principles. Applied information must be accurate, align to key concepts, that in turn support a job role supporting overall mission objectives. Additionally, within the instructional systems design model it is advised that there be two feedback mechanisms for the purpose of continuous quality improvement of a course—*formative* and *summative*.

Formative evaluation is intended to assess the level of success achieved in meeting the objectives established for instruction *within* the course offering. For example, a course might have an objective that students be able to solve twenty equations using the quadratic formula. Formative evaluation would be used to examine whether or not this objective was achieved and to explain the reasons why. The course could then be modified as a result of assessing this information.

Summative evaluation is an assessment of a course in a setting outside the course itself. Summative evaluation is typically more formal than formative evaluation, and may involve statistically rigorous study designs that might, for example, measure the effectiveness of two or more courses against some normative criteria. An example of this would be a comparison of the scores of students taking two math courses whose objectives and scope were similar, and whose approaches to teaching were different. A question driving such a study might be how well students from these courses do on a nationally administered exam like the Graduate Record Exam (GRE), for example. A summative evaluation might be conducted to determine the success of a course in providing skills that were supposed to be applicable in a real-world job setting. In this instance, the summative evaluation would assess how successfully the skills taught in a course were being applied on the job.

Formative and *summative* evaluation can be thought of as being similar in function to "verification and validation," (borrowing from the language of systems engineering). As verification, *effectiveness of instruction* can be defined in terms of the planned design outcomes that support specified, measurable, performance objectives *within* the context of instruction. As validation, *effectiveness* of instruction can be defined in terms of the outcomes supporting specified and measurable performance attributes that are demonstrated in the context of a specific job role or career path *outside* the instructional setting.

Another reason why the “How/what –to-do” continuum is a reasonable point of departure for this analysis is because it more difficult to deliver how-to-do instruction in the classroom. Because of the development difficulties that how-to-do courses present, they often take a back seat to easier-to-produce expositions of the “whats,” in the form of lecture with view-graphs, simply due to development time and cost. With the union of systematic instructional design and interactive distance education, instruction can now hopefully advance beyond the purely “show and tell” and “hearsay” approaches so often employed in adult classroom settings.

2.4 Updated Course Assessment Criteria

Since the release of Volume One of this analysis, there have been some improvements in understanding the factors affecting how-to-do versus what-to-do courses. These new discriminators will be described in the next section. While their use has no great significance as to the writer’s categorizing of the courses, they do provide some new insights into a generalizable method for assessing courses relative to their stated objectives.

The next section will provide the reader with the definitions of the key discriminators used to categorize the courses examined in this study.

3 Background, Overview and Synopsis

In volume two of this study, courses with a focus on **information management** and **network system security and survivability** were examined in order to draw a distinction between courses employing a what-to-do versus a how-to-do teaching approach.

3.1 Assumptions of the Study

A what-to-do course can be characterized as one that is designed to introduce concepts at a high level without a requirement for monitored skill development during or after instruction. what-to-do courses are typically carried out in seminar fashion, perhaps with dialogue between the instructor and students, but with no explicit requirement for team or individual exercises, performance verification, or other skill assessment that would verify success against defined performance targets.

How-to-do courses emphasize skill development and the performance of tasks related to the work for which the course participant is preparing. When systematic educational design and development approaches are used, the phrase "skill development" requires observable and measurable performance criteria to be stated explicitly as a part of the instructional design. Additionally, systematic instructional approaches require that these performance criteria support essential concepts of the curriculum and often, that the concepts and performance requirements align with real-world job tasks. This is a guiding assumption in regards to this study.

3.2 Performance Targets and Objects Revisited

In the systematic instructional design context, skills are operationally defined using various methods, however any of these variations is traceable to a common root—the intention to describe human performance in a precise and measurable way. Though the *style* of these methods differs, each requires that the definition of a skill have:

- a named task that is observable and measurable
- a description of the conditions under which the task is to be performed
- associated criteria for successfully performing the task.[3] The resulting *skill definition* is referred to as a "performance objective."

[3] "Preparing Instructional Objectives," Robert F. Mager, Fearon, Belmont, Calif. 1962. Mager's work established a de facto standard for correctness in the writing of performance objectives. Mager's primary distinction between well-written objectives and poor ones hung on the concept of "fuzziness,"

Again, systems engineers will recognize this strategy as corresponding in functional terms to "Entry, Task, Verification, and Exit" (ETVX) strategy used in problem decomposition for systems planning and development.

3.3 Course Assessment Factors

Given the complexity of cleanly distinguishing how-to-do and what-to-do courses in volume one, further development on reliable discriminators was needed. As stated earlier in the report, this did not seem to have a large effect on the final assessment of the courses, however more of the reasoning involved in making assessments was articulated and refined. The following are the criteria that were applied in the analysis:

"How-to-do" Characteristics

- presence of activities planned to support the attendee in fulfilling the requirements of a job-role (e.g., field studies, practicums, case studies, or labs)
- presence of a systematic instructional approach that includes an analysis of a job role to be supported by the educational experience outside of the instructional experience
- presence of a systematic instructional approach that identifies performance objectives containing observable/measurable task definitions and specific criteria for achieving success, as well as the conditions under which the tasks are to be performed
- presence of task analysis related to a job role and Bloom's taxonomic analysis corresponding to the job role
- incorporation of an overall plan to assess ROI subsequent to class participation
- presence of a systematic means of evaluating student performance in the instructional context
- presence of an analysis of audience characteristics that includes details pertaining to the attendees expected entry skills, experience, and knowledge
- presence of a needs assessment that describes the performance gap that is addressed within the instructional experience

"What-to-do" Characteristics

- absence of any of the items listed for How-to-do criteria (above). [- 1 to 8, an "-8" rating = the absence of any of the characteristics "how-to-do"]
- presence of large numbers of presentation slides (viewgraphs, PowerPoint™ slides, or other overhead projections)

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a term he used to describe the characteristic most poorly constructed objectives. A drawback with Mager's approach is that it has not been widely adopted, except in military and some industrial settings, and even then, his approach is often applied in an imprecise way. Nonetheless, systems engineers will recognize Mager's requirements for "conditions, actions, and criteria," to map cleanly to the common systems engineering convention requiring "entry conditions, task definition, verification, and exit criteria" to be stated for all well-defined task specifications—since systematic instructional design is derivative of systems engineering.

- primary reliance upon a “lecture-centric” instructional approach
- the presence of course subject matter whose purpose is mainly to inform in a context where it would be impractical to assess performance

The elements of the following legend were then applied as the course materials were examined:

Legend:

[P] = Potential candidate for distance/how-to-do conversion

[C] = Candidate for distance/how-to-do conversion

[NC] = Non-candidate

[W] = What-to-do course

3.4 Caveat

As was the case in volume one, virtually all of the courses examined had stated objectives, however these were often articulated in such a general way that inferences had to be made in order to judge their relative effectiveness for imparting usable skills. As with volume one, this presented the researcher with limitations on reliability in assessing these factors. In several cases involving offerings of courses by military organizations, the “inference gap” can be considered somewhat less wide than in instances for other organizations. This can be explained in two ways: one, military organizations have typically been influenced by the development principles of instructional systems design, and even though their application may vary in the level of rigor, the presence of systematic development practices is apparent in artifacts such as course slides and descriptions. Two, organizations outside the military are often not so heavily constrained to demonstrate a linkage from the exposition of concepts to applicable skills—this step being left up to course participants as an unmonitored, private concern.

4 Real Outcomes: IM and NSS

Virtually all of the courses inspected showed at least some level of performance objective, stated or implied, including *apparent* relationships to real-world job-task performance. Even though the descriptions and materials associated with their respective courses all state performance requirements, there is a lack of associated documentation to directly indicate the *job-task descriptions* and related concepts that the performance objectives support. The results of the examination for information management and network system security and survivability are therefore not very different from those in volume one, with two exceptions. There were no precedent analytical studies to cite for IM and NSS, and the number of course offerings is much greater than was anticipated. These two differences resulted in only minor modification to these essential conclusions:

- insufficiently specified performance objectives
- a lack of adequate information pertaining to job-task descriptions
- a lack of available documented course designs

… it was concluded that none of the courses within the existing inventory of available NDU, DAU, University or Commercial IM/NSS courses seems to provide *a complete* curriculum of how-to-do skills for particular job settings, military training grades, or related commercial best practices. In the case of information management, however, the number of commercial how-to-do courses is large for specific skill sets. A follow-on analysis of these concepts could be performed to determine the mapping of these courses to career paths and job skill sets. As it stands, these courses provide “bits and pieces” of skill sets required for various careers in system administration, network security, and information technology—none with a cohesive, underlying structure or plan.

At the conceptual level, it appears that these courses may have a relatively high-level of overlap. This implies that a curriculum architecture could be developed that would describe target knowledge, skills, and abilities (KSAs) for specific job roles. An analysis could then be conducted to determine deficiencies as courses from existing repositories were matched against the list of KSAs (by job role), and where “course gaps” could then be identified and resolved.

5 Conclusion: Considerations for Course Development

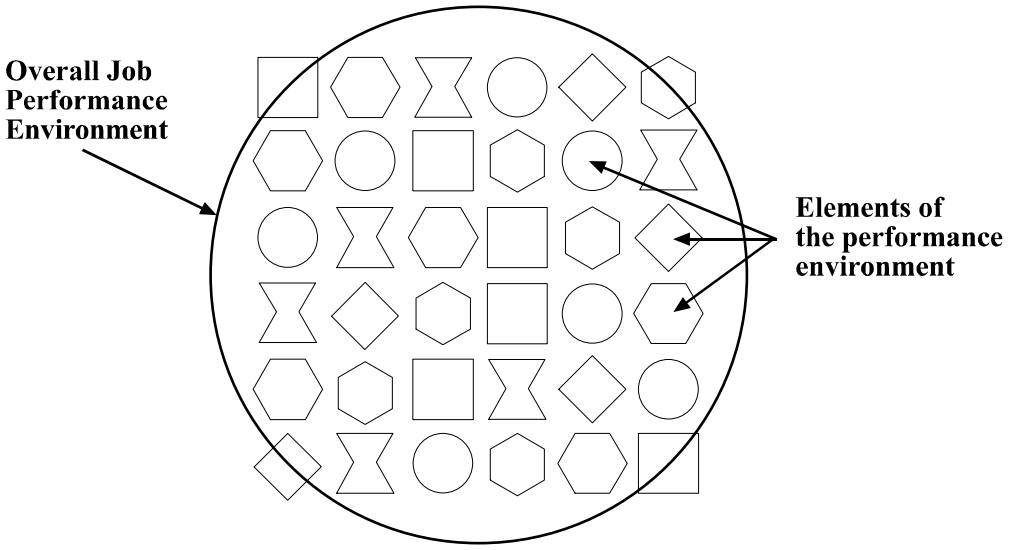

Figure 1: Job Performance and Curriculum

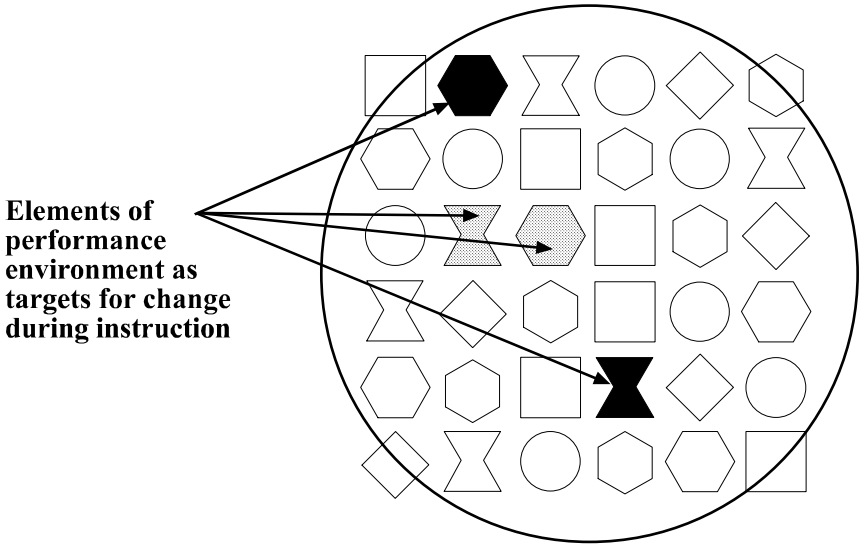

Figure 2: Example of Alignment to Purpose

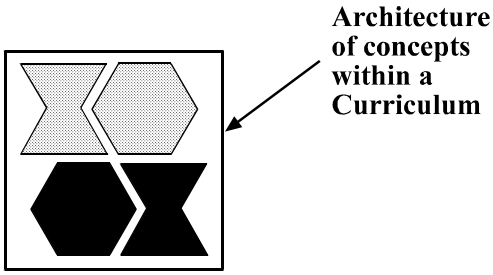

Figure 3: Relationship of Performance and Curriculum

Figures 1 through 3 describe the relationship of performance to a curriculum that is intended to influence performance that is directly related to the participant's ability on the job. In the systems approach to instructional design, this mapping is supposed to bear a very strong linkage if not a one-to-one relationship of skills to work performed. This strong linkage is contrasted with more general educational approaches that are appropriate for *enrichment, exploration, or discovery*. Although certainly the systems approach can be employed for any instructional purpose, its main utility historically has been in structuring experiences having a direct bearing on measurable performance change, as seen in Figure 4.

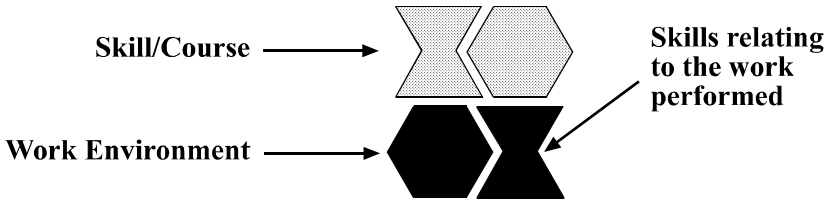

Figure 4: Example of Skills-to-Work Relationship

A curriculum typically amounts to *an arrangement of courses.* On a deeper level, however, one may define a curriculum as an *arrangement of concepts*, where *courses* are the vehicle by which those concepts are imparted. This notion is important to the systems approach because a *course* per se, is but one way in which concepts may be imparted. Thinking of a domain in terms of its concepts opens the door to a wider set of possibilities with respect to strategies for imparting knowledge. When a domain is understood in terms of its essential concepts, this allows for the use of strategies using potentially *many* appropriate implementations, including, but not limited to, courses. The emphasis on needs assessment before development addresses this relationship. The idea being that with well-understood needs, there is a better likelihood of appropriate use of instructional (and informational) strategies and tactics. This idea is essential when thinking in terms of the larger "instructional ecosystem" that may be required to support a course. Concepts that are taught in a course may require on-the-job reinforcement, *safety* for example.

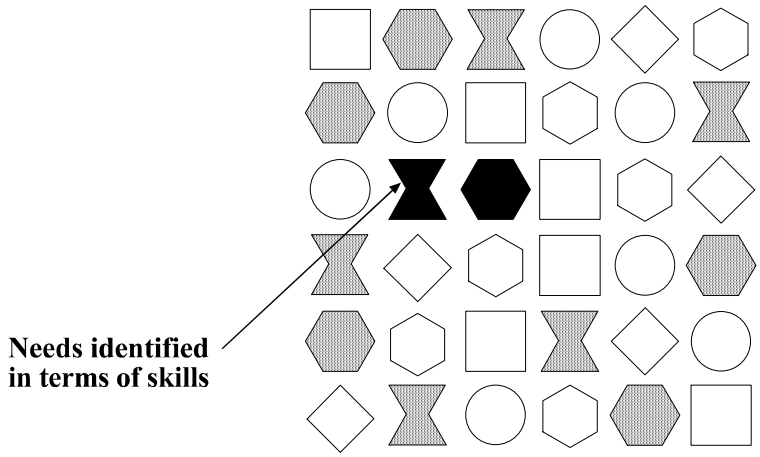

Figure 5: Concept Architecture of Needs Analysis

The implications of "concept architectures" for a distance-education infrastructure (as seen in Figure 5) are important because the infrastructure can be used to carry messages associated directly with concepts of a curriculum. It is easy to envision a curriculum on battlefield emergency care concepts that would have corresponding message snippets reinforced on a TV-network style broadcast supporting "important points to remember" during regular (extracurricular) programming. These *keystone* concepts would be tied directly to the training received, for example by Guard regulars. When concepts are reinforced as a part of a high-visibility plan of organizational programming, the sponsoring organization says, "yes, we really think these ideas are important and bear repeating." This kind of integrated conceptual infrastructure is not unknown, but its application is rare. It is the opinion of this writer that this approach is very effective and should be examined in light of the current opportunities afforded by distance education technology, as viewed in Figure 6.

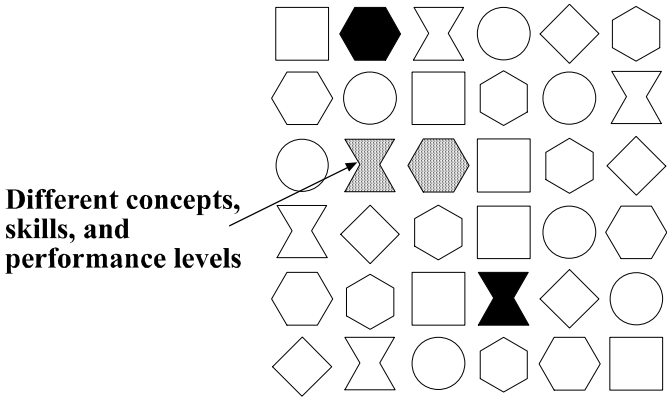

Figure 6: Comparison of Levels in Concept Architecture

Some curriculums have only a loose bearing on actual job performance, where the relationship between the curriculum and job performance is tenuous. Where systematic instructional approaches are concerned, "looseness" in this relationship is not generally considered acceptable. Therefore, the agenda of any instructional systems designer is to make instructional ex-

periences map as closely as possible to concepts, skills, and performance— tightly coupled to concepts and skills required for actual performance of work. In certain instances, this coupling might be considered inappropriate, where, for example, a course may be taken simply to provide awareness in a general sense. Knowing this distinction *before* the development process begins, however, can save money, time, and effort. The ability to distinguish the differences among knowledge types and approaches to the use of media allows "experience designers" to focus on those aspects of message design that are most important in terms of the contexts of their use.

For example, if a development team recognizes that there is no requirement to monitor and assess the target message recipient's level of understanding, then there is certainly no need to engage in the difficult task of writing performance objectives. For example, when it can be determined that a series of concepts needs to be transmitted, essentially in a one-way, non-interactive form, there are a host of considerations to be addressed that are fundamentally different from those involved in performance-based education. When the developer cannot assess the audience's comprehension of concepts using direct inspection, testing, or other means of evaluation, there is a need to apply methods of message design based on known techniques that will increase the likelihood that the message will be remembered. Examples of such techniques would include the use of *mnemonics*, powerfully associative graphical representations (see Figure 7). Understanding the nature of concepts and their importance to the mission at hand is essential for many reasons, including those having to do with project cost, schedule, and performance.

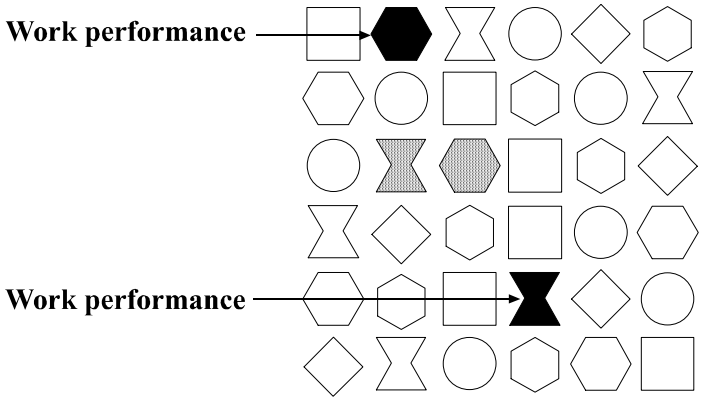

Figure 7: Comparison of Concept Components in Terms of Performance

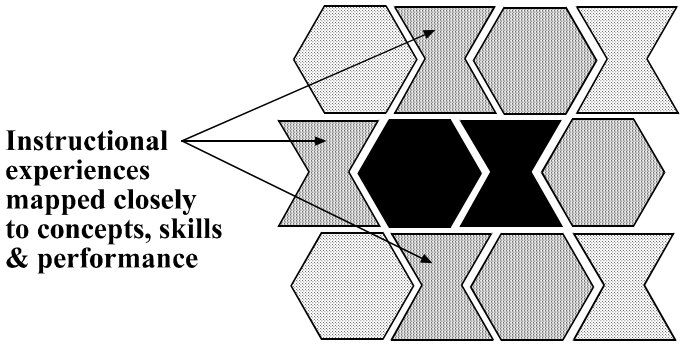

Figure 8: Example of Instructional Experiences in Concept Architecture

A clear conceptual architecture (such as Figure 8) used to organize an effective program of conceptual and behavioral influence is essential because of its capacity to reveal strategies to apply development resources, evaluation mechanisms, and other implementation factors appropriately in the context of the specified mission. Essentially the conceptual architecture provides a means of identifying the central targets of the system of communication such that risks may be identified, measurable goals may be defined, and precedence among ideas (as illustrated in Figure 9) can be determined. In short, the conceptual architecture defines the programmatic battlefield. From it, all of the terms to be defined, strategies to be employed, educational evaluation systems, and supporting educational project plans are derived.

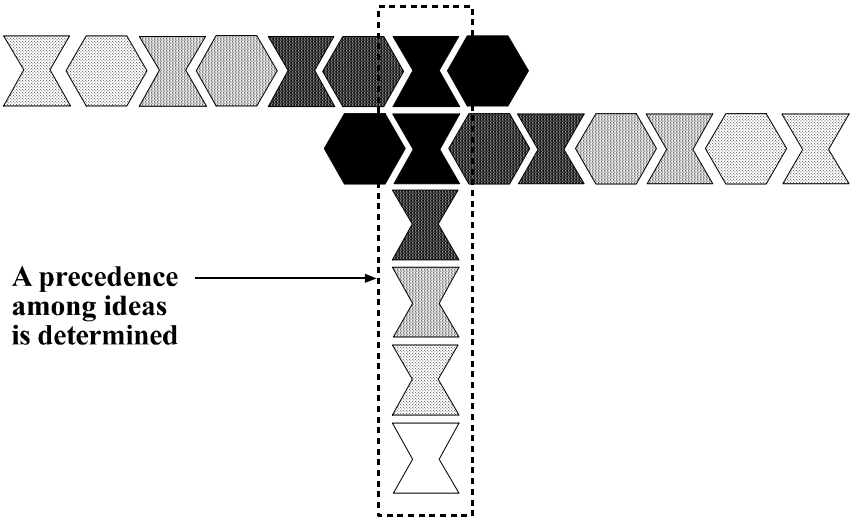

Figure 9: Programmed Strategy in Concept Architecture

Appendix A: Distance Education Course Development Factors

Factors in Distance Education Courses

There are several factors affecting the "conversion" of a course for distance learning. At a high level, these factors pertain strongly to cost, schedule, and performance. As stated earlier, *any* course can be broadcast as a distance learning product. At one end of the spectrum, there is a television-like broadcast; a one-way lecture to participants anywhere there is a satellite downlink or node on a digital video network.

Implicit in the requirements for this study, however, is the guidance to think in terms of the level of interaction and other quality attributes that are most characteristic of how-to-do instructional strategies. By their very nature, how-to-do strategies imply the use of simulation or other hands-on practices by participants. Since both SAM courses contain hands-on exercises to different degrees, this factor must be considered when these are used in an *interactive* distance education format. The issues surface in questions such as these:

Site logistics

(assuming at a minimum two-way audio, and one-way video…)

- If participants are located in many remote sites, how will exercises be coordinated?
- Will each of the sites have at least two participants?
- If there is only one participant at some of the sites, will the course materials accommodate them with an alternative exercise?

Costs for Course Re-engineering

- Given site logistics considerations, what is the percentage change in course materials to accommodate interactive distance education?
- Have instructors been trained to use interactive distance education?
- Have resources been allocated to analyze the need for changes to existing materials in order for them to be used in a distance education format?
- Have resources been allocated to analyze and account for the extent of changes needed to implement modifications course materials?
- Have resources been allocated to implement changes?
- Has time been allocated to accomplish the modifications?

Course Implementation

- How will participants monitor their success against course objectives?
- Are there documented plans to ensure full student participation?
- Is there a designated off-line POC for the course?
- Have instructions been provided to participants on how to reach the POC?
- Are there off-line assignments?
- How will performance on off-line assignments be assessed and feedback provided?

Given this partial listing of concerns related to distance education course engineering or re-engineering, it is obvious that preparing a course for *interactive* distance education may involve a lot of change, or very little depending upon how the materials were prepared in the first place, and the background of instructors.

Appendix B: Course Listings

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain

Industrial College of the Armed Forces (ICAF)

http://www.ndu.edu/ndu/icaf/homepage.html

	NATIONAL SECURITY STRATEGY	Courses are presented concurrently and in a closely integrated structure, presented within three major phases: the strategic decision making process; the international system and grand strategy; and grand strategy in transition. There are three class field trips in the fall semester: to Capitol Hill to meet with members of Congress and their staffs, to the Department of State to meet with the regional bureaus, and to the Civil War battlefield at Gettysburg, Pennsylvania, to examine the decision making process as it functioned before, during, and after that strategic engagement.				
1	**Strategic Logistics and Mobilization Course**	The first semester culminates with an exercise in which students develop a new U.S. national security strategy for the future that integrates economic, political, military, and cultural factors to achieve national objectives. COURSE OBJECTIVES. The learning objectives of this course are, from a thoroughly joint perspective, to challenge the students to discover concepts and approaches which, in their various combinations, will contribute to effective strategic logistics and mobilization for our future national security. Ultimately these will become the building blocks for an adaptable strategic logistics foundation upon which the country can pursue successfully its interests in an uncertain future. The following is a description of the segment of this course that deals with IM.	**Semester**	**How to Do**	**Potential**	**IM**

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		Logistics Flow and Throughput (CS) Understand the "time and place" utility. Examine distribution channels, the issue of just in case vs. just in time vs. just enough, risks and tradeoffs, etc., controlling the logistics flow, RSO&I, **logistics information management** and discipline. Desert Shield/Desert Storm case study. STUDENT/PROGRAM The mission of the Industrial College of the Armed Forces (ICAF) is to prepare selected military officers and civilians for senior leadership and staff positions by conducting postgraduate, executive-level courses of study and associated research dealing with the resource component of national power, with special emphasis on materiel acquisition and joint logistics, and their integration into national security strategy for peace and war. Reflecting this joint and interagency perspective, 67 percent of the student body is composed of military representatives from the land, sea and air Services, 25 percent from the Departments of Defense and State and 10 other federal agencies, 7 percent international military officers, and 1 percent from the private sector. ICAF awards its graduates a Master of Science degree in National Resource Strategy. [P 2, 7]				

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	Information Resources Management College http://www.ndu.edu/ndu/icaf/homepage.html					
		The Department of Information Strategy provides a multi-disciplinary perspective of policy and planning processes for defense **information management**, and ensures that College attendees develop leadership capabilities to implement information strategies. **The Department of Information Technology** concentrates on the latest advances in modeling, simulation, expert systems, decision technologies, computer hardware, computer software, and communications technologies through an examination of capabilities, uses, and related issues. The **Systems Acquisition Department** examines policies, principles, and issues surrounding DOD information technology program management and acquisition to include an analysis of current weaknesses and options for reform. STUDENT: Senior defense professionals. Students represent multiple communities including functional managers planning for the use of information within their organizations, and information managers performing systems integration functions. The College also provides mandatory courses for individuals in the communications-computer field of the Acquisition Workforce. Student not only gains knowledge, qualifications, and competencies for Defense IRM leadership, but contributes to the growth and excellence of the field itself. The College has four major programs. • Advanced Management Program (AMP) is a senior-level course covering contemporary IRM policy, technology, and acquisition issues. This program is supplemented by a number of advanced studies courses which are also available to students in the National War College (NWC) and the Industrial College of the Armed Forces (ICAF). • acquisition courses which fall under the auspices of the Defense Acquisition University. The courses are for members of the Defense Acquisition Workforce and address communications-computer and software competencies. • a series of intensive courses related to specific problematic areas and emerging concepts of IRM. special symposia, seminars, and workshops focusing on IRM issues, lessons learned and future directions.				
	Advanced Management Program (senior-level course)					
2		The fourteen week graduate-level Advanced Management Program (AMP) provides functional and technical **information resources** managers with an integrated understanding of new policies and imperatives such as the Clinger-Cohen Act of 1996, the Federal Acquisition Streamlining Act	14 weeks	How to Do	Candidate	IM

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		(FASA) and the Federal Acquisition Reform Act (FARA). Graduates will be able to form effective managerial partnerships to effectively justify, allocate, and apply **information resource**s to mission requirements in compliance with regulatory, policy, and ethical standards. [P 1] Students who attend this course must be nominated by their respective military services or organizations and hold the grade of O-5 and above or civilian grade GS/GM 14 and above. On space-available basis, the program is also open to non-DOD federal government employees, and when sponsored by the NDU Foundation, employees of private organizations. Applicants must possess a B.S., B.A. or equivalent degree. The AMP has two offerings per year: one in the fall and one in the spring. **Core curriculum** Foundations of IRM presents an overview of **information resource** management concepts and principles, and the mechanisms for policy formation, implementation, and evaluation in today's IRM environment, and the relationships among the political, economic, social, fiscal, and technological forces that are changing government. **Enterprise Level Planning for Information Management** addresses the politics and complexity of strategic planning and implementing information infrastructures capable of delivering desired results, satisfying the mission requirements of the enterprise and responding to citizens' needs.				

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		Transforming Work and Organizations focuses on transforming work and processes in the public sector to create more efficient, effective government operations, emphasizing the ability of organizational leaders to introduce and align the role of technology with all aspects of the organization. This component concludes with a visit to local public or private organizations to examine IT-enabled process reengineering. [P 1]				
		Acquisition & Systems Development examines policies, issues, and management practices in the acquisition of information technology to support work processes. Approaches for both rapid and custom acquisition of technologies and current methods in software development and program management are investigated. Throughout the core, technologies and methodologies that assist in the management of these processes are discussed and demonstrated.				
		Field Study [P 1]				
		Emerging Information Technologies explores those technologies which are particularly useful in assisting managers to make better decisions, including artificial intelligence, expert systems, and neural networks, and provides an overview of the trends information systems technology.				
		Information Systems Acquisition provides in-depth examination of IT acquisition policies and practices including examples of advanced project and program management techniques, elements of systems acquisition strategies, techniques for achieving clarity in specifications and evaluation criteria; source selection and alternative proposal evaluation techniques and				

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		strategies; deployment and operations related to managing and evaluating contract performance, and affects of acquisition reform on current policies, procedures, and practices . **Public Policy in the Information Age** focuses on information-related public policy issues and structures of special relevance to military officers and senior government officials. Analytic frameworks and theirassumptions are examined and applied to substantive policy issues. **Functional Leadership in the Information Age** focuses on the changing roles, relationships, and responsibilities of functional leaders in partnership with technical leaders that are required for planning and using **information resources** to cause strategic change in an organization Subjects such as enterprise integration, empowerment, performance measurement, work transformation economics, and planning and implementing work redesign are explored in some depth. **AMP - ADVANCED STUDIES** The Advanced Studies Program allows each AMP student to do additional study in areas of particular professional interest. Students may opt for courses related to *information strategies, information technologies, functional information management, or acquisition management*. Students must take a minimum of two advanced studies courses, or a research project may be substituted with prior approval.				

INFORMATION RESOURCE STRATEGIES

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
3	**5503 Measuring Results Of Organizational Performance**	Provides strategies and techniques for assessing performance results of an organization as part of a strategic planning or budgeting process, to meet regulatory oversight requirements (e.g., GPRA) or to assess a large-scale performance improvement initiative. Using guidelines from and the experiences of DOD and other government agencies in their attempts to measure performance results, the course extracts lessons learned concerning approaches and resource requirements to establish and validate performance measurement instrumentation, collect and organize performance data, as well as to analyze and report results. Special emphasis in the course is given to the assessment of customer satisfaction and other organizational outcomes, as well as to information management and technological issues surrounding performance measurement. [H, P 1, P 2]	14 weeks	How to Do	Candidate	IM
4	**5504 Information Visualization**	Focuses on visualizing information and displaying complex information and relationships. Building upon substantive research in cognitive disciplines, graphic design, advertising, and visualization technology, this course introduces information visualization techniques and visualization related technology. Emphasis is placed on applying information visualization to the key leadership and managerial tasks of communicating complex information (e.g., performance metrics, analytical results) to enhance or accelerate organizational learning. Individual, team, and organizational uses of information visualization techniques and technologies are discussed.	14 weeks	What to Do	Candidate	IM
5	**5506 Computer Methods For**	Provides a working knowledge of modern, computer-assisted meth-	14 weeks	How to Do	Candidate	IM

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	Management Decisions	ods for finding quantitative solutions to complex management problems involving resource allocation, personnel assignment, project planning, facility location, network analysis, system forecasting, inventory control, task scheduling, staffing analysis and program management. The essential background for several different optimization and artificial intelligence techniques are presented (including linear programming, neural networks and genetic algorithms) along with instruction in formulating and solving real-world problems with easy to use software packages. Laboratory sessions augment classroom instruction in providing "hands-on" experience in finding optimal solutions to a wide variety of practical management problems. [P 1]				
6	**5507 Innovative Thinking For The Information Age**	Examines new ways of individual and institutional thinking for the information age. It focuses on the nature of effective thinking and its relationship to technological innovation in the U.S. military. Subjects range from innovation and creativity, framing, the influence of paradigms on thinking, intuition, systems thinking, the influence of service culture, to chaos and nonlinear dynamics. Case studies illustrating individual and institutional thinking about technological innovation in the U.S. military are integrated throughout the course. [P 1]	14 weeks	What to Do	Candidate	IM
7	**5508 Third Wave Organizations**	Examines the Third Wave organization. It describes the successful Third Wave organization as open, enabled by technology, and constantly learning and adapting to an increasingly complex and changing environment. Emphasis is placed on the organizational processes and structures that enhance an organization's ability to innovate and compete in the information age.	14 weeks	What to Do	Potential candidate	IM

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		The course explores: the nature of the Third Wave organization; the role of leadership and technology; differences in Second Wave and Third Wave organizations; and strategies for the creation and renewal of Third Wave organizations. [W]				
8	**5509 System Dynamics: Dealing With Complexity**	Presents an alternative way of thinking about and understanding complexity that often accompanies national security planning, policy analysis or decision making. This course reflects a departure from traditional linear, reductionist thinking. It presents methods for examining dynamic, interdependent relationships among the critical variables that often define complex issues as well as methods for facilitating design and evaluation of work processes as part of process improvement initiatives. Emphasizing the practical application of these methods, the course uses computer modeling and simulation to demonstrate the dramatic consequences of simple notions such as information feedback, time delays, and nonlinear relationships. [P 1]	14 weeks	What to Do	Potential candidate	IM
	FUNCTIONAL INFORMATION MANAGEMENT (5510-5520)					
9	**5513 The Information Highway**	Analyzes trends, issues and uses of telecommunications as a component of functional business strategies and **Information Resource Management (IRM).** Specific telecommunications issues include costs, security, privacy, access and regulation. The course considers selected technologies on the "Information Highway" and their applicability to DOD. Examples include satellite systems, cellular technology, the Internet, and applications such as electronic interchange. Guest speakers and demonstrations will be used to illustrate applications. While this is	14 weeks	What to Do	Potential candidate	IM

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No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		a non-technical course, students will be provided limited hands-on familiarization with commercial telecommunications services, and bulletin boards, and the Internet. [W]				
10	**5514 Information Security**	Focuses on the concepts, principles and techniques underlying successful information security programs. The course covers strategies for establishing policies and procedures and analyzes the role of senior management in promoting employee security awareness and balancing production and protection. It examines emerging disciplines and the issues surrounding them. It also addresses new computer and network technologies, how they work, and methods for assessing risk. Topical issues cover: computer privacy, the regulatory and legal environment, standards for electronic commerce, as well as DOD requirements and initiatives. Exercises and case analyses are used to develop practical knowledge and skills. [NSS P 1]	14 weeks	How to Do	Potential candidate	NSS
11	**5516 Information Economics**	Focuses on advanced concepts, principles, and techniques for identifying the value to an organization of investments in information technology. The course explores methodologies and criteria for assessing the strategic value of competing alternatives. It expands the traditional concepts of benefit, cost, and risk in developing assessment criteria. It analyzes senior management's role in achieving consensus on values and related criteria and examines how those criteria are used by functional managers and information systems managers in developing proposals, assessing the relative worth of alternatives, and improving the decision making quality and speed. Exercises and case analyses are	14 weeks	How to Do	Potential candidate	IM

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		used to develop practical knowledge and skills. [P 1]				
12	**5518 Electronic Commerce: Doing Business On The Information Highway**	Provides an introduction to conducting government business electronically, with a particular focus on the issues involved in implementing electronic commerce (EC). Broad topics include the components of EC; government initiatives in EC; inter-organizational systems; EC functionalities supported by use of the Internet; and issues of integrity, security, risk, and vulnerabilities. Access to EC research sites, government sites, electronic payment sites, commercial and services directories; industry associations and other intermediaries are explored during hands-on sessions. Examples and case studies in both government and private sectors, such as on-line procurement, are presented to explore various aspects of implementing electronic commerce. [W]	14 weeks	What to Do	Potential candidate	IM
	INFORMATION TECHNOLOGIES (5521-5535)					
13	**5522 Emerging Information Technologies**	Explores advances in all aspects of information technology from the perspective of both the functional and the **information resource manager**. The course includes discussions of the technologies that are particularly useful in assisting managers to make better decisions, including artificial intelligence, expert systems, and neural networks. It continues with an overview of the trends in information systems technology and gives particular attention to automatic speech recognition, natural language understanding, software technologies, communication technologies, and the emerging field of multimedia. It concludes with each student presenting the findings of their course assignment. NOTE: Open only to ICAF, NWC [W]	14 weeks	What to Do	Potential candidate	IM

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14	**5523 Applying Multimedia Technologies**	Provides a practical introduction to multimedia technologies, emphasizing their application in enhancing presentations, delivering education and training and serving as the user interface to modern executive information systems. The underlying hardware, software and communications technologies are explored in sufficient depth to allow assessment of competing approaches. Technical trends are identified as well as initiatives being pursued within the DOD. The process of developing a multimedia presentation is presented: objectives development, storyboarding, content capture (text, images, sound, and video), final assembly and product delivery. "Hands-on" laboratory experiences are provided to give the student practice in creating simple, straightforward multimedia presentations. [H P 1]	14 weeks	How to Do	Potential candidate	IM
16	**5525 Virtual Reality For Managers**	Provides a basic understanding of Virtual Reality (VR), focusing on the creation and use of virtual worlds in education, manufacturing, medicine and science, and entertainment. The course covers the development and use of virtual reality in both military and civilian environments. Underlying scientific concepts, software tools and techniques, and fielded applications of virtual reality are explored in sufficient depth to allow the user to become familiar with issues surrounding the use of VR. The process of developing virtual worlds is presented, including hands-on laboratory sessions provided to give the student experience in creating simple applications. [H P 1]	14 weeks	How to Do	Potential candidate	IM
17	**5526 Expert Systems Technologies**	Investigates in-depth the most technologically mature aspect of Artificial Intelligence, that of Ex-	14 weeks	How to Do	Potential candidate	IM

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		pert Systems. Included in the course is an overview of what Expert Systems are, what they can do, and how they are being used today in industry and within the government. Among the topics included are: the history of expert systems; examples of systems currently in use; methods for choosing suitable problems for this technology; ways to represent and acquire knowledge; inference engines; the development, validation and implementation of expert systems; available computer-based tools for expert systems development; and the future of expert systems. Additionally, the course provides a hands-on experience in which students have the opportunity to develop an expert system of their own. [H P 1]				
18	**5528 Group Decision Making And Groupware**	Studies and offers the student a participatory experience in effective group decision making and its enhancement through electronic meeting systems. Theoretical aspects of group decision making such as group composition, communication and influence, opinion aggregation/voting, brainstorming, decision visualization, valuation methods, decision structuring, and negotiation are examined in the context of the information age. The shortcomings of traditional meetings are explored along with the capacity of groupware to eliminate them. Students are exposed to the wide-ranging use of group decision support in the public and private sectors, especially in National Security organizations. The course employs extensive hands-on exercises, guest speakers and field trips to organizations in government and/or industry. [H P 1]	14 weeks	How to Do	Candidate	IM
19	**5529 Group Decision Making And Groupware**	Examines in-depth digital collaboration technology (CT) in the Federal government, especially Na-	14 weeks	How to Do	Potential Candidate	IM

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		tional Security organizations. Students participate in the exploration and creation of a wide range of applications within the multimedia communications and information structure of groupware technology. Students witness the power of global information sharing for creating a virtual/4A (Anytime Anywhere Anybody Anything) organization, for optimizing business processes, and for enhancing corporate memory. The course employs extensive hands on exercises, guest speakers and visits to outside organizations. [H P 1]				
20	**5531 Telecommunications Technology**	Examines technical issues, trends, and emerging technologies in telecommunications. The goal of the course is to provide managers with a greater ability to choose between technological alternatives, plan future telecommunications infrastructure and anticipate future advances. The course considers selected technical issues and topics such as implications of ATM, SONET, FDDI, and the significance of shifts in regulatory or industry structure. Guest speakers provide perspective to the seminar discussions. (Open to AMP, IWS, ICAF, NWC.) [W]	14 weeks	What to Do	Potential candidate	IM
	INFORMATION SYSTEMS ACQUISITION (5536-5555)					
21	**5546 Future Directions In Software Management**	Investigates cutting-edge practices for producing high quality software based systems at lower cost. The dual focuses on software engineering and Program Management deal with software development paradigms; software process credibility; software architectures; software quality management technologies; software program office challenges and risk management. The course extensively uses case studies to demonstrate both successful and unsuccessful	14 weeks	What to Do	Potential candidate	IM

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		software management issues and to develop the student's skills in analysis and evaluation. The course features a selection of notable guest speakers who are actively involved in institutionalizing sound software management practices in a variety of organizational settings. [P 1]				
	Intensive Course Program					
		The College's intensive courses provide a solid foundation in senior-level concepts and techniques. The curriculum emphasizes the development of knowledge and understanding **through concentration on information management principles and their application.** Broad areas of coverage include **information resource**s strategies, functional **information management** and information technologies. Typical course titles are "Public Policy for the Information Age" and "The Information Highway," although course offerings vary year-to-year in order to ensure that topics are relevant and current. Courses range in length from one to five days and are designed for military officers, grades 0-4 and above and civilians, grades GS/GM 12 and above. **For specific information on course offerings, call the IRM** College Registrar at (202) 685-3892 or DSN 325-3892. [H P 1, 2, 7]				
22	**Managing Information Architectures and Infrastructures (ARC)**	COURSE DESCRIPTION: Examines the architectural responsibilities of the Chief Information Officer (CIO) as outlined in recent legislation and directives. The importance of architectures in process redesign, the reuse of corporate assets, and the building of new ventures are stressed. The course introduces a wide range of architectures, and discusses the managerial issues involved in each type. It also examines the goals of the emerging national infrastructures, with particular emphasis placed on the architectural initiatives being pursued by the DoD. Among the topics covered are the importance of integrated and interoperable C4I systems, acquisition life cycle issues, common operating environments and the position of standards, open systems and COTS in achieving architectural consistency. RECOMMENDED ATTENDANCE:	5 days	How to Do	Candidate	IM

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		The course is for CIOs and program managers who are responsible for leading their organizations in the development of new I/T initiatives and architectures. The course has a managerial versus a technical focus and is particularly applicable to senior leaders responsible to the CIO. The course is recommended for civilian grades GS/GM 13 to 15 and military grades O-5 to O-6. [H P 7] COURSE GOAL: The goal of the course is to improve the student's ability to proactively pursue a vision that integrates business and technology strategies through architectures and infrastructures. The course is largely conceptual and analytical rather than technical. Students will also become acquainted with the major issues and current thinking on the establishment of a corporate or agency architecture. COURSE OBJECTIVES: The objectives of the course are to illustrate the relationships between architectures and strategic planning and understand the effects of new legislation on the architectural process; explore how the CIO can identify IT infrastructure components and assets to support new business opportunities and implement new technology requirements; and to analyze the organizational roles, policies and procedures designed to ensure interoperability for C4I systems. [P 2]				
23	**Contemporary Approaches to Acquisition Reform (CAR)**	COURSE DESCRIPTION: Provides an update of acquisition reform and concurrent changes in the global political and economic environment. The course presents an integrated perspective of best commercial management practices and emerging **information tech-**	5 days	What to Do	Potential candidate	IM

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		nologies with a focus on improving acquisitions. The challenges of an increasingly complex and dynamic environment provide the context for examining acquisition as a partnership between representatives of the acquisition community, the customers they serve, and the contractors who provide products and services. Contemporary issues create a backdrop for introducing new business practices and supporting **information technologies** capable of assisting the acquisition official to deliver a best value product that meets customer needs and fulfills policy objectives. RECOMMENDED ATTENDANCE: This course is appropriate for acquisition professionals in all types of defense programs including those deal with weapons, MCCR, C3I and AIS; civilian grades GS/GM 14 through 15 and military in grades O5 through O6. This is an excellent follow-on course for individuals who are already certified in level three of an acquisition career field. [P 2, 7] COURSE GOAL: The goal of the course is to update and enhance awareness among acquisition professionals of the latest trends in best commercial and management practices for planning, defining and executing acquisition programs in such a manner as to improve quality service to the customer while simultaneously assuring best business value to the Federal Government. COURSE OBJECTIVES: The objectives of the course are to assess the impact of the latest legal and regulatory changes on the acquisition process; to promote improvements in the acquisition process by enhancing understand-				

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		ing and awareness of emerging management practices; and to enhance understanding needed for making sound business decisions about acquisition and use of emerging technologies.				
24	**Critical Information Systems Technologies (CST)**	COURSE DESCRIPTION: Probes the rapid advances in all aspects of **information systems technology** from the perspective of both the functional and the **information resource manager.** The course provides an overview of both the current state-of-the-art and the trends in **information systems technology** with particular attention to software development technologies, data management, computer systems hardware, human-computer interfaces, voice recognition, natural language understanding, collaborative technologies, telecommunications technologies, the Internet, multimedia technologies, and virtual reality. It concludes with a round table discussion on how these technologies can be employed within an organization. RECOMMENDED ATTENDANCE: This course is appropriate for functional and **information resource managers** who seek a greater understanding of the current state-of-the-art and the trends in information systems technology. No formal technical background is required. The course is recommended for civilian grades GS/GM 13-15 and for military grades O-4 - O-6. [P 7] COURSE GOAL: The goal of this course is to provide the student with a high level understanding of new technologies that will likely have a major impact on their organizations and professional lives. Included in this under-	5 days	What to Do	Non-candidate	IM

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		standing is the balancing of technological risk, costs, and objectives when fielding new technologies. COURSE OBJECTIVES: The objectives of this course are: (1) to explain recent developments in hardware, software and other information systems technologies; (2) to provide a forum where the students can assess significant impacts of these technologies on their organizations, on their colleagues, and themselves; (3) to synthesize technology developments and match these developments to organizational goals.				
25	**Electronic Commerce: Doing Business on the Information Highway**	COURSE DESCRIPTION: Provides an introduction to conducting business electronically, with a particular focus on the issues involved in implementing electronic commerce (EC). Broad topics include the components of EC; government initiatives in EC; electronic government; EC functionality supported by use of the Internet; Intranets and Extranets; and issues of integrity, security, risk, and vulnerabilities. Access to EC research sites, government sites, electronic payment sites, commercial and services directories, industry associations and other intermediaries are explored during hands-on sessions. Examples and case studies in both government and the private sector are presented to explore various aspects of implementing electronic commerce. [P 1] RECOMMENDED ATTENDANCE: The course has been designed for mid to senior level executives in both technical and non-technical functions, who are interested in harnessing the latest technological developments for conducting business activities. The course does not	5 days	What to Do	Potential candidate	IM

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		require or assume any background in the area of the Internet or Electronic Commerce. Civilian grades GS/GM 12-15 and military managers in grades O-4 - O-6 are appropriate.[P 7] COURSE GOAL: The overall goal of the course is to provide students with a working knowledge of Electronic Commerce and the Internet and the issues involved in implementing electronic commerce. COURSE OBJECTIVES: The objectives of the course are to provide the student with a broad knowledge of the many ways in which Electronic Commerce can be applied in government operations, and a *working knowledge* of how the Internet/Intranet/Extranet capabilities can be harnessed for conducting business electronically.				
26	**Improving Organizational Performance With Intelligent Decision Systems (IDS)**	COURSE DESCRIPTION: Investigates emerging artificial intelligence technologies that constitute the field of Intelligent Decision Systems: Expert Systems, Neural Networks, Genetic Algorithms, Fuzzy Logic, Case-Based Reasoning and Intelligent Agents. Background for each of these technologies is provided, the available tools and techniques are discussed, and a variety of real world applications are presented. The course focuses on using these systems to improve organizational performance and reduce costs, especially in the areas of data analysis, data mining and organizational decision-making. Demonstrations and *hands-on lab exercises* are used to illustrate concepts and applications. The course concludes with a panel discussion on potential applications in the students' organizations. [P 1]		How to Do	Candidate	IM

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		RECOMMENDED ATTENDANCE: This course is appropriate for functional and **information resource managers** who wish to understand how intelligent decision systems can be used to improve performance in their organizations. No formal technical background is required. The course is recommended for civilian grades GS/GM 13-15 and for military grades O-4 - O-6. [P 7] COURSE GOAL: The goal of the course is to give the student a background and appreciation for the growing field of Intelligent Decision Systems, provide the opportunity to develop small-scale systems, and develop a working knowledge of current applications of Intelligent Decision Systems. COURSE OBJECTIVES: The objectives of the course are to provide the student with a broad knowledge of the theory, tools, and techniques of Intelligent Decision Systems, and illustrate and demonstrate real-world applications of Intelligent Decision Systems. [P 1]				
27	**The Information Highway (IHW)**	COURSE DESCRIPTION: Analyzes trends, issues and uses of telecommunications as a component of functional business strategies and **Information Resource Management**. Specific telecommunications issues include costs, security, privacy, access and regulation. The course considers select technologies on the "Information Highway" and their applicability to the Federal Government and the Department of Defense. Examples include satellites, cellular technology, bulletin board systems, electronic data interchange and electronic publication. Guest speakers and demonstrations are used to	5 days	What to Do	Potential candidate	IM

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		illustrate applications. While this is a non-technical course, students are provided limited hands-on familiarization with commercial telecommunications-based information systems, government and private bulletin boards, and the Internet. RECOMMENDED ATTENDANCE: The course is recommended for managers who need a basic understanding about the burgeoning use of telecommunications within government and industry. It is not intended for telecommunications specialists, and assumes no background in the area of telecommunications theory. It is intended for civilian grades GS/GM 12-15 and military managers 0-4 to 0-6. COURSE GOAL: The goal of the Information Highway course is to provide the student with a high level understanding of current telecommunications trends and applications. Students discuss and evaluate management concerns, including the social, functional and economic impacts of using these emerging technologies. COURSE OBJECTIVES: The objectives of the course are to explain recent developments in telecommunications theory, technology and application; assess significant impacts of these developments on modern business and government organizations, and upon the individuals within them; synthesize issues that must be considered when applying telecommunications technologies.				
28	**Information Management Planning (IMP)**	COURSE DESCRIPTION: Presents an approach to planning which integrates agency strategic	5 days	What to Do	Potential candidate	IM

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No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		planning, performance planning, **information management** planning, and the agency budget. The intent of the course is to examine a comprehensive mission-driven planning framework that combines planning requirements and implications of the Government Performance and Results Act of 1993, Paperwork Reduction Act of 1995, and **Information Management** Technology Reform Act of 1996. Interdependencies between program and **information management** planning provide a context for examining planning guidelines, principles, relationships and dependencies which link investment in **information resources** to improved mission performance. The course emphasizes DoD's standards-based architecture planning methodology. RECOMMENDED ATTENDANCE: This course is appropriate for persons seeking to leverage the capabilities of **information technology** as a means of improving mission performance. It is particularly well suited to those preparing agency strategic plans and performance plans that link investment in IT to strategic goals and objectives. The course is recommended for civilian grades GS/GM 12 - 15 and military grades O4 - O6. [P 7] COURSE GOAL: The goal of this course is to promote improved mission and program performance through better means of planning for introduction, management and operation of a comprehensive, enterprise-wide information infrastructure. COURSE OBJECTIVES: The objectives of the course are to Evaluate the **IM planning re-**				

Information Technology Courses

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		quirements and implications of the Paperwork Reduction Act of 1995, Government Performance and Results Act of 1993, and the Information Technology Management Reform Act of 1996 and to assess **information management** planning principles, activities, and relationships which are critical to planning and implementing a comprehensive, mission-driven, agency-wide information infrastructure.				
29	**Information Visualization (INV)**	COURSE DESCRIPTION: Focuses on visualizing information and displaying complex information and relationships. Building upon substantive research in cognitive disciplines, graphic design, advertising, and visualization technology, this course introduces information visualization techniques and visualization related technology. Emphasis is placed on applying information visualization to the key leadership and managerial tasks of communicating complex information (e.g., performance metrics, and analytical results) to enhance or accelerate organizational learning. Individual, team, and organizational uses of information visualization techniques and technologies are discussed. RECOMMENDED ATTENDANCE: The course is valuable for senior level functional and technical personnel who are involved in communicating complex information or in the design of information systems. The course is recommended for civilian grades GS/GM 12 - 15 and military grades O-4 - O-6. COURSE GOAL: The goal of the course is to give the student an appreciation for the	5 days	What to Do	Potential candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		ways in which we perceive information, provide the opportunity to investigate techniques for communicating visually, and develop a working knowledge of relevant visualization technologies. COURSE OBJECTIVES: The objectives of the course are to provide the student with a broad knowledge of information visualization concepts, technologies, and applications and to assess the information needs for organizational leadership and management, and provide visually-oriented information-based solutions.				
30	**Leadership for the 21st Century (LDC)**	Examines 21st century leadership and organization. It describes the successful 21st century leader and organization as constantly learning and adapting to an increasingly complex, changing, and information-rich environment. Emphasis is placed on "out-of-the-box thinking," individual and organizational innovation, and the processes and structures that enhance an organization's ability to learn, adapt, and compete in the information age. The course also explores the role of information and technology in the 21st century organization; the relationships between learning, change, and strategic planning; and the new abilities required for leading in the 21st century. RECOMMENDED ATTENDANCE: The course is for mid to upper level managers who lead and organize 21st century organizations. The course is recommended for civilian grades GS/GM 13 to 15 and military grades 0-5 to 0-6. COURSE GOAL: The overall goal of the course is to improve students' ability to create	5 days	What to Do	Potential candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		and lead the adaptive, information-rich organization of tomorrow. Students will gain an understanding students will be able to create and design organizational processes and structures that increase the flexibility and agility of an organization, thus improving the organization's ability to adapt, learn, and compete in the 21st century. The course is conceptual and analytical, not technical. COURSE OBJECTIVES: The objectives of the course are to illustrate the relationships between a complex, changing, and information-rich environment and the 21st century organization; to develop students' facility with out-of-the-box thinking and innovation; to enable students to create and design effective processes and structures that increase organizational flexibility and agility; to enable students to use information and information technology to enhance an organization's ability to learn, adapt, and compete in the information age; to illustrate the relationships between learning, change, and strategic planning; and to develop students' facility with learning organizations and the new abilities that they require.				
31	**Reengineering Organizational Processes (LTO)**	(Previously titled Leveraging Technology for Organizational Change) COURSE DESCRIPTION: Examines strategies, processes and resources for significantly improving organizational performance and highlights the potential contribution of new and emerging technologies. The course contrasts incremental performance improvement versus fundamental discontinuous organizational change. It provides a management perspective of the capabilities of	5 days	What to Do	Potential candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		technologies that are expected in the next few years to change the way federal agencies achieve their missions. The course focuses on techniques and available resources for redesigning work processes to take full advantage of these new technologies and for gaining commitment from both sponsors and users to make the change work. Guest speakers and case studies drawn from federal government and industry support the course. RECOMMENDED ATTENDANCE: The course is particularly valuable for functional managers who are contemplating or have experienced difficulty in initiating a process improvement effort. Executives who oversee improvement efforts and IRM personnel who support functional process improvement will also find the course useful. Attendance by higher level managers in civilian grades GS/GM 13 - 15 and military grades O-5 to O-6 is particularly encouraged. Personnel at the GS/GM-12 and O-4 level who have significant responsibilities for major organizational change efforts will also benefit. COURSE GOAL: The goal of the course is to provide the student with the knowledge basis required to address the practical questions of how to reengineer organizations and manage more effectively in the Information Age. COURSE OBJECTIVES: The objectives of the course are to select and apply appropriate methodologies, tools and techniques for use in specifying, evaluating, modeling, measuring, cost justifying and redesigning business processes; to integrate elements of technology, policy and human fac-				

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		tors in the context of organization and work transformation; and to analyze the impacts of organizational culture when undertaking technology leveraged change initiatives and select viable strategies for implementing sustainable organizational change.				
32	**Evaluating Strategic Alternatives with Modeling and Simulation (MAS)**	COURSE DESCRIPTION: Explores the use of modeling and simulation as a decision-making tool in evaluating alternate approaches to the design, development and operation of core business processes. It features the use of both process simulation and system dynamics simulation methods in gaining insight into the complex interrelationships found in personnel, logistics, maintenance, customer service, and financial processes. While geared for managers, the course provides sufficient insight into the underlying technology to ensure that the student has a grasp of the inherent capabilities and limitations of simulation. Hands-on experience in using modern PC-based simulation development environments is an integral part of the course. RECOMMENDED ATTENDANCE: This course is appropriate for functional and **information resource managers** who seek a greater understanding of the role of simulation in strategic decision-making. No formal technical background is required, but basic keyboard skills are helpful. The course is recommended for civilian grades GS/GM 13-15 and for military grades O-4 - O-6. COURSE GOAL: The goal of the course is to provide the student with a comprehensive	5 days	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		understanding of the way in which state-of-the-art computer simulation is being used as a key decision making tool in evaluating alternate business process designs. The depth of the course is sufficient to enable the student to initiate a simulation study in support of such n effort in his or her organization, structured to maximize the likelihood of success. COURSE OBJECTIVES: The objectives of the course are to provide an introduction to the use of computer simulation in evaluating alternate business process designs; to use state-of-the-art PC-based simulation development environments to develop simple simulations of work flow processes; and to assess the impact which computer simulation has had as a decision-making tool in both the public and private sectors.				
33	**Measuring Results of Organizational Performance (MOP)**	COURSE DESCRIPTION: Provides strategies and techniques for assessing performance results of an organization as part of a strategic planning or budgeting process, to meet regulatory oversight requirements (e.g., GPRA, Clinger-Cohen Act), or to assess a large-scale performance improvement initiative. Using guidelines and experiences by DoD and other government agency in their attempts to measure performance results, the course extracts lessons learned concerning approaches and resource requirements to establish and validate performance measurement instrumentation, collect and organize performance data, as well as to analyze and report results. Special emphasis in the course is given to the assessment of customer satisfaction and other organizational outcomes, as well as to **information management** and technological issues surrounding	5 days	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		performance measurement. RECOMMENDED AUDIENCE: The course is appropriate for both functional and **information resource managers**. The course is particularly valuable for military and civilian leaders responsible for systematically assessing performance of their organizations. The course is recommended for civilian grades GS/GM 12 to15 and military grades O-4 to O-6. COURSE GOAL: The goal of the course is to enable students to assess the performance of an organization in a conclusive, credible, and compelling manner, thereby aiding effective organizational decision-making. COURSE OBJECTIVES: The objectives of the course are to define requirements for conducting an organizational assessment and the research questions that must be answered in order to meet the requirements; identify and justify a set of accurate, credible, and practical performance measures and data collection techniques, including a survey if necessary, that will serve as indicators of organizational performance and answer the research questions; describe and justify a strategy for drawing a sample of cases for data collection purposes that will accurately represent the data from the full accessible population of cases; specify and apply the appropriate techniques for analyzing the collected data in order to produce conclusive answers to the research questions; and design a reporting mechanism for communicating assessment results in a form that is understandable, compelling, and likely to lead to effective decision making by the organization.				

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
34	**Information Technology Capital Planning (MTI)**	COURSE DESCRIPTION: Focuses on state-of-the-art strategies for **IT** Capital Planning, with an emphasis on assessing and managing **information technology** as an investment. The three phases of the **IT** investment management process are considered: selection of proposals, control of on-going projects, and post-implementation (existing systems) assessments. The relationship of IT performance measures to mission performance measures is explored. The course examines the roles of the CIO and other managers in developing IT assessment criteria and considers how the criteria are used in IT capital planning and in managing the IT portfolio. Individual and team exercises are employed, including a simulation of the operation of the Investment Review Board. RECOMMENDED ATTENDANCE: The course is for mid to upper level non-technical and technical managers, including non-technical functional managers, process/operations managers, and information systems managers. Civilian managers in grades GS/GM 12-15 and military managers in grades 0-4 to 0-6 are appropriate. COURSE GOAL: The goal of the course is to provide an understanding of a practical, state-of-the-art approach to IT investment analysis, including associated strategies, tools, and techniques. The course is intended to help individuals and agencies in their efforts to meet the requirements of the Clinger-Cohen Act. COURSE OBJECTIVES: The objectives of this course are to provide an understanding of a	5 days	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		state-of-the-art methodology for IT Capital Planning and Managing IT as an investment and to demonstrate the value of an IT assessment methodology presented as a tool for managing the IT portfolio, from selection of proposals and control of on-going projects to post-implementation assessment and decision-making				
35	**New World of the CIO (NWC)**	COURSE DESCRIPTION: Provides a broad-based summary of duties of a Chief Information Officer. Using recent legislation as a backdrop, the course examines both explicit and implicit functions of the CIO. The primary focus is on how these laws, as well as current policy and best business practices should be applied when planning, acquiring, managing, and using **information resources**. Set in the context of an increasingly and dynamic global environment, the course provides a comprehensive examination of **information management** in the Federal Government with emphasis on the increasing dependency of the agency on information technology as the primary means of improving mission performance and service delivery while sustaining budget and staffing reductions. RECOMMENDED ATTENDANCE: The course is appropriate for all persons whose principle duties are those of a Chief Information Officer or who work on the CIO staff of an organization. It is intended for civilians in grades GS/GM 13 through 15 and military in grades O4 through O6. COURSE GOAL: The goal of the course is to provide a solid foundation for making im-	5 days	What to Do	Potential candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		proved policy and business decisions when acquiring, managing, and using **information resources** to improve mission and program performance. COURSE OBJECTIVES: The objectives of this course are to assess the impact of the latest legal and policy changes on information management in the Federal Government and to assess the role of a CIO in promoting and using information technology as a means of improving an agency's mission performance and service delivery.				
36	**Managing Information Security in a Networked Environment (SEC)**	COURSE DESCRIPTION: Provides an executive-level perspective on protecting computer-based information in a modern networked environment. The course covers a wide range of topics including basics of information security, the nature of the threat, computer crime, trusted systems, network security technology, encryption, electronic commerce and the Internet, legal and privacy issues, infrastructure security, and emerging security technologies. The course also addresses strategies for developing a sound security policy and defines the role of management in promoting employee security awareness and performing risk analysis. Case studies, demonstrations, hands-on exercises and guest speakers are used to enhance classroom discussions. RECOMMENDED ATTENDANCE: This course is appropriate for functional and technical managers who require a good foundation in the threats to security of information in a networked environment and emerging methods for countering those threats. The course is recommended for civilian grades GS/GM 12-15 and military grades	5 days	What to Do		NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		O-4 to O-6. COURSE GOAL: The goal of the course is to acquaint the student with the major issues involved in ensuring security for computer-based information and to provide the foundation for developing the infrastructure, policies and procedures to safeguard it. COURSE OBJECTIVES: The objectives of the course are to raise awareness about the issues involving information security among functional and **information resource managers**; to explore the manager's role in establishing information security policy; and to provide a foundation for making enlightened decisions and tradeoffs concerning he technological, legal and procedural aspects of protecting information in an pen, networked environment.				
37	**Strategic Management Of Your Web Site (Web)**	COURSE DESCRIPTION: Presents approaches for making the Web site a strategic asset of the DoD service organization. Although the course does touch on some technical issues associated with developing and maintaining a Web site (e.g., architecture, server hardware/software decisions, connectivity, and site security), its emphasis is on strategies for enriching an organization's own Web site by taking full advantage of its capabilities to provide dynamic service to its customers and staff. Discussions and examples deal with the design of the type, organization, appearance, and usability of information presented via the Web site consistent with Department of Defense policy. The course also deals with the control of access to the site (Internet versus Intranet), methods for gathering and making effective use of data on people who	5 days	What to Do	Non-candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		access the Web site, as well as techniques for building a team composed of both internal and external contributors to the site. RECOMMENDED ATTENDANCE: This course is appropriate for senior level functional and technical personnel who can influence the way their organization uses its Web site. The course is recommended for civilian grades GS/GM 12-15 and military grades O-4 to O-6. GOAL: The overall goal of the course is to provide an understanding of the management issues and strategies to enable students to design the strategic aspects of an Internet or Intranet Web site that will enhance the ability of their organization to attain its mission. OBJECTIVES: The objectives of the course are to enable students to analyze the requirements of the Web site for internal users (e.g., database integration, help desk services, human resource services, research services) and external users (e.g., catalog, electronic commerce, customer services, information services) and define the particular services to be offered; plan the architecture, staffing, resourcing, and management of the creation or major modification of a Web site that will meet user requirements; design the arrangement and appearance of Web pages at the Web site for functional effectiveness and professional image; collect, analyze, and apply data on Web site users and their utilization to improve site effectiveness; and plan implementation strategies for assuring secure and legal functioning of the Web site.				

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
38	**Telecom-munications Technology For Managers**	COURSE DESCRIPTION: Examines technical issues, trends, and emerging technologies in telecommunications. The goal of the course is to provide managers with a greater ability to choose between technological alternatives, plan future telecommunications infrastructure, and anticipate future advances. The course considers selected technical issues and topics such as implications of ATM, SONET, FDDI, and the significance of shifts in regulatory or industry structure RECOMMENDED ATTENDANCE: This course is appropriate for program managers and other non-telecommunications professionals in civilian grades GS/GM 12 through 15 and military in grades O4 through O6. It is a survey course and assumes no background in the area of telecommunications theory. COURSE GOAL: This course focuses on telecommunications principles, systems and issues. Students emerge from this course with a working knowledge of telecommunications technology and have the ability to assess the managerial and policy consequences of embracing various technologies. COURSE OBJECTIVES: The objectives of the course are to explain recent developments in telecommunications technology; assess the impact of these technologies on the performance of Automated Information Systems; and provide a framework to synthesize the issues that must be considered in evaluating telecommunications services.	5 days	What to Do	Potential candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
	IRM College courses conducted at DAU					
39	**Intermediate Information Systems Acquisition**	DESCRIPTION: Intermediate Information Systems Acquisition is a computer-based course for mid-level managers with responsibilities in information systems (IS)/information technology (IT) acquisitions. Students develop competence in applying IS/IT management skills in IS/IT planning, organizing, directing, and controlling information systems acquisition programs. Areas of application include: the unique aspects of IS/IT (including software) acquisition management, information technology as a capital investment, DoD IS/IT strategic planning and architectural principles related to IS/IT acquisitions, interoperability techniques and methods, emerging IT as potential solutions in satisfying DoD IT requirements, systems and software design and analysis techniques, IS/IT requirements and configuration management, business process reengineering, IS/IT quality assurance, IS/IT deployment, and the contracting process in concert with the program management and budgetary process in IS/IT acquisitions. Team-oriented exercises allow students to apply the IS/IT management concepts to current IS/IT acquisition management scenarios. Students are required to use notebook computers to accomplish class preparation, exercises, and course tests. COURSE OBJECTIVES: Students who successfully complete this course will be able to: • explain the concepts and terminology that comprise the major information systems acquisition management processes and how the processes interact	14 days	How to Do	Candidate	IM (SAM)

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		• define the roles, activities, and relationships of Department of Defense, other government entities, and industry that participate in and affect the acquisition process • develop the management skills needed to effectively and efficiently use people, money, facilities, information, and time in the accomplishment of information systems acquisition objectives • recognize internal and external factors that influence and constrain the information systems acquisition process and understand how to deal with these factors in light of risk, uncertainty, and change WHO SHOULD ATTEND: Level I certified mid-level managers with responsibilities in information systems (IS)/information technology (IT) acquisitions. PREREQUISITES: IRM 101, ACQ 201 Computer-based course for mid-level managers with responsibilities in information systems/information technology acquisitions.				
40	**Intermediate Software Acquisition Management**	DESCRIPTION: This course extends the career education of the software acquisition professional through applied learning using in-depth study of real and hypothetical software acquisition cases from within DoD to include C4I, AIS and MCCR. The students extend their knowledge of current best practices and critical success factors for software acquisition by actively applying concepts and tools of risk management and project management, to include plans for defining procure-	14 days	How to Do	Candidate	IM (SAM)

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		ment requirements, vendor qualification, evaluation of proposal evaluation criteria, and creation and evaluation of documentation relevant to software acquisition. Learning processes focus on all key competencies established for Level II software acquisition professionals. COURSE OBJECTIVES: Students who successfully complete this course will be able to: • apply acquisition strategies used for software and software-intensive systems • define the concepts of software architecture and systems architecture • describe program software life cycle planning and test program planning factors • apply requirements management and risk mitigation • define software acquisition • explain the roles of Domain Analysis and modeling in requirements analysis WHO SHOULD ATTEND: This course is open to all military officers of rank O-3 through O-5 and DoD civilians GS-9 through GS-12, working in, or selected for, software acquisition management positions. This course is mandatory for those serving in Level II acquisition positions whose duties include software acquisition management. PREREQUISITES: ACQ 201, SAM 101.				
41	**Advanced Software Acquisition Management**	DESCRIPTION: Advanced Software Acquisition Management is designed for senior	14 days	How to Do	Candidate	IM (SAM)

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		managers with responsibility for programs in which software is a critical component. Readings, cases, and guest speakers extend across the domains of weapon systems, command and control systems, and management information systems; providing students a comprehensive framework for comparison and critical reflection. The course focuses on key software acquisition competencies established for Level III acquisition professionals, while concentrating on software-specific considerations such as reuse, COTS, open systems standards, and software metrics. The course challenges students to critically evaluate alternative models, methods, and tools applicable to software acquisition through the use of real and hypothetical DoD software acquisition cases. Software acquisition planning and management, software risk identification and mitigation, and software acquisition critical success factors and best practices are also considered. COURSE OBJECTIVES: Students who successfully complete this course will be able to: • analyze the causes of cost, schedule, and performance problems in large software efforts and explore strategies for avoiding or correcting such problems • examine salient differences in strategy, methods, and tools between commercial software acquisition efforts and DoD efforts. • develop an ability to recognize and selectively adopt commercial practices for use in a DoD software program • understand the organizational and cultural dynamics of pro-				

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		gram offices and software development teams • be able to evaluate the suitability of alternative organizational structures, including integrated product teams • evaluate and select software metrics that will provide insight into program status and facilitate early detection of potential problems • assess the current state of the Federal and DoD acquisition reform movements and incorporate new policies into current and future software acquisition programs WHO SHOULD ATTEND: This course is required of software acquisition personnel who serve in the software acquisition field as Level III managers or technical experts. Civilian grades GS/GM 13 to 15 and military ranks O-4 to O-6 are appropriate. PREREQUISITES: SAM 201				
42	**Advanced Information Systems Acquisition**	DESCRIPTION: Advanced Information Systems Acquisition is a computer-based course for senior managers with responsibilities in information systems (IS)/information technology (IT) acquisitions. Students develop mastery level skills in evaluating and recommending strategies, evaluating plans, and making decisions in IS/IT acquisition management by using current technology to perform authentic tasks in a realistic, team oriented environment. Areas of mastery include: the unique aspects of information systems acquisition management, evaluating IT as a capital investment, tailoring the DoD program management system to an IS/IT acquisition, evaluating and rec-	15 days	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		ommending DoD IS/IT strategic plans and architectures for IS/IT acquisitions, assessing and recommending techniques used to ensure DoD IS/IT interoperability, evaluating and recommending emerging IT for IS/IT acquisition strategies, evaluating and recommending systems and software engineering methods and models, using business process reengineering to determine IS/IT requirements, evaluating an IS/IT program for adequate quality assurance, recommending performance measures/metrics for IS/IT (including software) acquisition performance, and using the contracting process in concert with the program management and budgetary process in IS/IT acquisitions. Team-oriented cases allow students to evaluate realistic and current IS/IT acquisition management scenarios. Students are required to use notebook computers to accomplish class preparation, team exercises, and individual assignments. Through study, reflection, research, and individual and team activities, students develop the skills and professionalism required in today's acquisition workforce. COURSE OBJECTIVES: Students who successfully complete this course will be able to: • evaluate issues and make strategic level decisions in Department of Defense (DoD) information systems (IS)/ information technology (IT) acquisition program management, **DoD information technology management**, and DoD IT procurement process management • effectively lead or participate in IT Integrated Product				

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		Teams that make acquisition reform initiatives operational and manage IT as a capital investment WHO SHOULD ATTEND: Senior managers in civilian grades GS/GM 13 to 15 and military ranks O-4 to O-6 who have successfully completed the requirements for Level II in the Communications-Computer Career Field. PREREQUISITES: IRM 201.				
	Institute for National Strategic Studies					
		The School of Information Warfare and Strategy, the teaching and outreach arm of INSS's Advanced Concepts, Technologies, and Information Studies Directorate. The School teaches Information Strategies to senior-level students of NDU and shorter specialty courses in information warfare to a broader government community. The school's curriculum focuses on the use of information in the planning and execution of national strategy, military strategy, and joint operations.				
	Information Warfare					
43	**6600 Defensive Information Warfare: Protecting Cyberspace**	This course provides a foundation in information protection issues. Information warfare is conceptualized as cooperation, competition, coordination, and conflict in the Information Age. The information warfare system is viewed from the perspective of protecting the lifeblood of the Information Age. The issues and concepts presented and discussed provide a foundation for examining and making decisions about protecting cyberspace used by our society, economy, infrastructure and military. TS/SCI clearance required.		What to Do	Non-candidate	IM
44	**6675 Legal Foundations Of Information Age Conflict**	This course provides students with a foundation in some of the critical legal issues shaping conflict in the Information Age. The issues and concepts with which the students are challenged provide them with the theoretical underpinnings necessary for their examination of		What to Do	Potential candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		National Security areas, such as space and telecommunications, and closes with an analysis of crucial conceptual issues, such as, whether information warfare constitutes a "use of force" in the legal sense.				
45	**6775 Psychological Aspects Of Information Warfare**	This course examines the elements of warfare that have collectively been categorized as perception management. These manipulative techniques can be decisive strategically and operationally when integrated with other operations and other elements of information warfare. The course investigates historical case studies, current methodologies, and concludes with an exercise in designing an information warfare strategy. Secret Clearance required..		How to Do	Potential candidate	IM
46	**6825 Military Strategy And Operational Planning In The Information Age**	This course introduces the evolving concepts of information warfare and their integration into operational planning conducted by theater CINCs. The course covers the foundations of operational planning and includes a review of Defense Planning Systems and their relationship to the development of theater strategy and deliberate planning. Particular emphasis is placed on the development of command and control warfare (C2W) strategies and their integration into theater campaign plans.		What to Do	Potential candidate	IM
47	**6550 Executive Overview Of Information Warfare**	This course introduces the evolving concepts of information warfare and integrates technology, operations, and doctrine as a force multiplier in conventional conflict and as a unique form of warfare. This includes consideration of current initiatives to implement these concepts at the operational and strategic levels of warfare in support of national security and joint warfare. The primary objective of the course is to cause the student to reflect and draw conclusions about		What to Do	Potential candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		the nature of warfare in the Information Age. Secret Clearance required.				
	Commercial					
48	**Network Administration For UNIX Systems**	COURSE OVERVIEW: The Network Administration for UNIX Systems course covers the duties of a network administrator. Topics discussed include setting up your systems in a networked environment that includes the hardware and software configuration, sharing files and file systems over a network, problem solving and prevention, and network security.	3 days	How to Do	Candidate	IM
49	**Network Programming for UNIX Systems**	COURSE OVERVIEW: The Network Programming for UNIX Systems course provides a complete understanding of the philosophy and mechanics of developing distributed applications on a UNIX system. Students will be shown the how and why of distributed programming and will be given the necessary tools to implement such systems on their own.	3 days	How to Do	Candidate	IM
50	**UNIX TCP/IP Networking Essentials**	COURSE OVERVIEW: This course provides the student with an introduction to TCP/IP (Transmission Control Protocol/Internet Control). As an introductory course, it defines the difference between the TCP and IP protocols and the various protocols in the family of TCP/IP products. PREREQUISITES: Familiarity with UNIX, including the Bourne or C shell and the DG/UX file structure and process hierarchy. Experience such as that gained by taking the Using UNIX course is suggested.	4 to 6 hours	How to Do	Candidate	IM
51	**TCP/IP Concepts**	COURSE OVERVIEW: The TCP/IP Concepts course pro-	4 days	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		vides a complete understanding of the basics of TCP/IP and is designed for experienced programmers, network planners and support personnel. Topics covered include TCP/IP Architecture, Internet Layer, Transport Layer, Applications Layer, Accessing Network Services and the Internet.				
52	**Novell Web Server Management**	COURSE OVERVIEW: The Novell Web Server Management course covers NetWare Web Server management tasks. Broadly, the course covers setting up Internet or Intranet solutions. It deals with how to set up a NetWare Web server, set up an IPX/IP gateway for IPX clients, and restrict access to a NetWare Web server. This course is designed for NetWare 4 system managers, CNEs, CNIs, MCNEs, WWW consultants, system integrators, Internet Service Providers, and resellers. Upon completing this course, students will understand how to: distinguish between Internet and Intranet solutions and identify their benefits; determine Internet connectivity options for a Web server; install a NetWare Web Server; configure a NetWare Web Server; configure the IPX/IP gateway; use Novell Directory Services from a Web browser. PREREQUISITES: Students taking this course should know how the Internet functions. They should also have a working knowledge of networking with Novell.	4 hours	How to Do	Candidate	IM
53	**Building Firewalls and Internet Security**	COURSE OVERVIEW: This course provides the essential skills needed to select the firewall best suited to their company policy. Upon successful completion of this course, students will be able to: understand various Internet and firewall policy issues, apply	3.5 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		TCP/IP protocol to firewalls; examine critical firewall construction techniques; evaluate various types of firewalls, investigate tools for auditing firewalls; understand how hackers mount attacks and how to react to an intrusion. This course is intended for Network managers and specialists, and those IT professionals who are responsible for implementing and maintaining effective Internet and Intranet security. PREREQUISITES: Students should have basic to intermediate understanding of principles in internetworking and have experience with networking tools.				
54	**Internet: Global Communications**	COURSE OVERVIEW: Whether your interest in the Internet is business or pleasure, the Internet: Global Communications course is designed to start you on your way to becoming a proficient and confident Internet citizen. You'll learn background information about how the Internet works and be able to communicate with the global community using your e-mail application. You'll also learn about mailing lists and how to join groups of people discussing common topics of interests. This course is intended for students who already have access to an Internet connection and knowledge of their electronic mail system.	3 hours	How to Do	Candidate	IM
55	**Internet: Joining the Global Community**	COURSE OVERVIEW: The Internet: Joining the Global Community course is a well-rounded exploration of the Internet programs, sites and uses. Users will learn the myriad of ways they can uncover and access information at sites on the Internet. From using Telnet to access a library's database of holdings to conducting discussions in one of the thousands of newsgroups to accessing spe-	6 hours	How to Do	Candidate	

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		cific information on the World Wide Web. This course is designed so the user can find the information they want – quickly and efficiently. Before taking this course, users may wish to complete **The Internet: Global Communications** course.				
56	**Planning and Designing Corporate Intranets**	COURSE OVERVIEW: Many companies are turning to the technologies offered by the Internet to meet their communication needs. Implementing an Intranet is a complicated task with many technological and organizational considerations to take into account. This course offers students a means of planning and designing an efficient and appropriate Intranet solution. Planning and Designing Corporate Intranets is designed to provide a capstone, as well as integral training, for the Intranet working specialist. This course is intended for network administrators, IT specialists, or corporate networking professionals with responsibility for planning and designing an Intranet prior to implementation. PREREQUISITES: The user should have comprehensive knowledge of Internet and Intranet technologies, tools, and related skills as delivered in previous courses in the curriculum, and should have prior experience of project management.	4 hours	How to Do	Candidate	IM
57	**ActiveX Tools and Technology Essentials**	COURSE OVERVIEW: The ActiveX Tools and Technology Essentials course is the introductory course of Gartner Learning's courses. It introduces the audience to ActiveX technology, and gives an overview of the origins of ActiveX. This training will enable the audience to use ActiveX technology effectively, efficiently, to develop dynamic and interactive		How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		Web pages. The audience for this course is users who know how to use a text editor such as Notepad and should understand basic Web development principles. This course was developed in partnership with Prosoft I-Net Solutions, Inc. PREREQUISITES: Learners should be familiar with Windows and Windows 95 and should know the basics of VBScript.				
58	**Microsoft Visual Basic 5.0, ActiveX, and the Internet**	COURSE OVERVIEW: The Microsoft Visual Basic 5.0, ActiveX, and the Internet course introduces you to ActiveX features that are available in Visual Basic 5.0 and provides information that will help you to develop applications with Visual Basic 5.0. The audience for this course is developers and programmers with an intermediate level of experience with Visual Basic 5.0. PREREQUISITES: Students taking this course should have an understanding of basic development principles; an understanding of object-oriented principles, including analysis and design; an understanding of the Windows 95 or Windows NT operating system. Students should have completed the following Gartner Learning courses: Using Windows 95 or Using Windows NT course; Microsoft Visual Basic 5.0 Essentials; Microsoft Visual Basic 5.0 Client/Server Development.		How to Do	Candidate	IM
59	**Microsoft Visual Basic 5.0 Client/Server Development**	COURSE OVERVIEW: The Microsoft Visual Basic 5.0 Client/Server Development course is for developers and programmers who have a proficient-level understanding of Visual Basic 5.0 and want to gain knowledge on developing production-ready applica-	4 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		tions for use in a client/server environment. Students will learn how to: simplify application development using resource files, the Application Wizard, and pre-built controls; maintain a project's forms and controls using the Forms collection and Controls collection; use classes to define frequently used objects; access and manipulate data in internal and external databases; use bound and unbound controls to present information. The student will learn to create an application that can browse HTML pages and perform functions over the Internet. The course also teaches how to call DLL routines, display on-line Help in an application, and selectively compile portions or versions of an application's code. The student also learns how to handle run-time errors. PREREQUISITES: Students taking this course should have taken Gartner Learning's Gaining Expertise on Windows 95 or Using Windows NT Workstation 4.0 (or equivalent knowledge of the operating system). They should also have taken Microsoft Visual Basic 5.0 Essentials which provides an understanding of the basic development principles, object-oriented principles including analysis and design.				
60	**SQL*Net and the Multi-Threaded Server**	COURSE OVERVIEW: The SQL*Net and the Multi-Threaded Server course addresses the unique features of the multi-threaded server and compares the multi-threaded server to the dedicated server environment. It also provides the information needed to configure the multi-threaded server. In addition, this course explains the tunable components of the multi-threaded server, and how to monitor the system for optimal performance. The audience of this	2-3 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		course is database administrators, systems administrators, network managers, and technical support personnel. Upon course completion, users will be able to: describe SQL*Net architecture; recognize when SQL*Net is needed; recognize architectural features of the multi-threaded server; identify advantages of the multi-threaded server; set initialization parameters to configure the multi-threaded server; add and manage dispatcher processes; manage shared server processes; avoid artificial deadlocks; tune the multi-threaded server. PREREQUISITES: The Oracle7 Administration and Advanced Oracle7 Administration courses, and a working knowledge of the Oracle7 database.				
61	**Advanced Architecture**	COURSE OVERVIEW: The Advanced Architecture course helps students learn about client/server architecture and learn how client/server architecture is affected by emerging technologies. Distributed databases, cooperative processing technologies (OCE, COM, and OLE, CORBA and SOM), and case studies that give a hands-on view of client/server implementation are also discussed in this course. After successfully completing this course, students will know how to understand advantages and limitations of the different types of client/server architecture; identify emerging technologies such as Distributed Computing Environment (DCE), Object Linking and Embedding (OLE), and System Object Model (SOM); and understand distributed databases and their impact on client/server implementation. This course is designed for technical architects, functional architects, and system analysts.	4 to 6 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		PREREQUISITES: Students are expected to have successfully completed the Client/Server Concepts course from Gartner Learning, or have a basic knowledge of client/server systems prior to enrolling in this course.				
62	**Advanced Client Topics**	COURSE OVERVIEW: The Advanced Client Topics course teaches students about client/server model methods from the perspective of clients. Roles and responsibilities of the client, discussions about graphical user interfaces (GUIs), processing distribution, and development tools are also covered in this course. Case studies that give a hands-on view of two companies that are designing client/server systems are also included. After successfully completing this course, students will know how to define the client/server model and its strengths and limitations from the client perspective; explore the impact of graphical user interfaces on productivity; understand issues related to processing distribution including workstations, network access, and information access; and identify tools and technologies available for client-based development. This course is designed for technical architects, functional architects, project managers, system analysts, and system designers. PREREQUISITES: Students are expected to have successfully completed the Client/Server Concepts course from Gartner Learning, and have experience with graphical user interfaces (GUIs) prior to enrolling in this course.	4 to 6 hours	How to Do	Candidate	IM
63	**Advanced Server Topics**	COURSE OVERVIEW: The Advanced Server Topics	4 to 6 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		course teaches students about methods within the client/server model from the perspective of the server. Roles and responsibilities of the server and the various server types are also included in this course. Case studies that give a hands-on view of two companies that are choosing servers are also discussed. After successfully completing this course, students will know how to define the client/server model and its strengths and limitations from the client perspective; understand the purposes and limitations of referential integrity, triggers, and procedures; identify the characteristics of database, print, file, and applications servers; and understand the issues associated with server hardware including storage, performance, and available technology alternatives. This course is designed for technical architects, project managers, systems analysts, and systems designers. PREREQUISITES: Students are expected to have successfully completed Gartner Learning's Client/Server Concepts and Understanding Relational Databases courses, and have experience with networks prior to enrolling in this course.				
64	**Client/Server Concepts**	COURSE OVERVIEW: The Client/Server Concepts course helps students gain a broad overview of the client/server model and learn how that model has evolved from traditional architecture to current networks. Client/server architectures and methodologies are also discussed, as are some of the future technical challenges. Case studies are included in the course to provide real-life examples of the material presented. After successfully completing this course, students will know about	4 to 6 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		the strengths and limitations of client/server architecture; understand the key technology and development issues, and explore their role within client/server computing; identify the key components of the client/server model; and explore the challenges and opportunities of client/server computing within the software development arena. This course is designed for functional architects, technical architects, project managers, and system analysts. PREREQUISITES: Students are expected to have a working knowledge of relational databases and communication concepts prior to enrolling in this course. Gartner Learning recommends that students complete the Understanding Relational Databases course prior to enrolling in this course.				
65	**Introduction to the Client/Server World**	COURSE OVERVIEW: The Introduction to the Client/Server World course provides students with an overview of client/server computing, and discusses client/server concepts, principles, and terminology. After successfully completing this course, students will know about the history of the client/server model; about client/server mythology; about client/server vendors and tools; and about various client/server implementation issues. This course is designed for executives, managers, sales and marketing professionals, and users who work with computers and are interested in understanding client/server computing. PREREQUISITES: None.	1 day	How to Do	Candidate	IM
66	**IBM DB2 Basic Application De-**	COURSE OVERVIEW: IBM's DB2 offers a powerful ap-	3 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
	velopment	proach to database management with integrated object-relational multimedia capabilities and support for the industry's leading platforms today. The IBM DB2 Basic Application Development course introduces the basics of application development, covering database objects and data manipulation. This course is one of two covering IBM DB2 application development. The other course, IBM DB2 Advanced Application Development, should be taken after completing this one. Both of these courses must be completed to prepare the student to take the IBM Exam 505 - DB2 UDB Application Development. There are a total of five courses in this curriculum. : IBM DB2 Server Fundamentals, IBM DB2 Administration Essentials, IBM DB2 Advanced Administration, IBM DB2 Basic Application Development, IBM DB2 Advanced Application Development. The course is intended for anyone who plans, implements, or maintains databases. This would include people who work as application developers, data managers, and information specialists. PREREQUISITES: Users taking this course should possess excellent computer skills. They should have experience of databases and SQL. They should take the foundation course, IBM DB2 Server Fundamentals, also developed by Gartner Group Learning, prior to taking this course. In addition, Fundamentals of SQL is another Gartner Group Learning course that is considered to be a prerequisite of this course.				
67	**IBM DB2 Advanced Application Development**	COURSE OVERVIEW: IBM's DB2 offers a powerful approach to database management with integrated object-relational multimedia capabilities and sup-	3 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		port for the industry's leading platforms today. The IBM DB2 Advanced Application Development course builds on the information in the IBM DB2 Basic Application Development course and covers the more advanced skills needed by an application developer. This is one of two courses covering IBM DB2 application development. The other Gartner Learning course, IBM DB2 Basic Application Development, should be taken before completing this one. Both of these courses must be completed to prepare the student to take the IBM Exam 505 - DB2 UDB Application Development. There are a total of five courses in this curriculum. : IBM DB2 Server Fundamentals, IBM DB2 Administration Essentials, IBM DB2 Advanced Administration, IBM DB2 Basic Application Development, IBM DB2 Advanced Application Development. The course is intended for anyone who plans, implements, or maintains databases. This would include people who work as application developers, data managers, and information specialists. PREREQUISITES: Users taking this course should possess excellent computer skills. They should have experience of databases and SQL. They should also have taken the foundation course, IBM DB2 Server Fundamentals, developed by Gartner Group Learning, prior to taking this course. In addition, Fundamentals of SQL is another Gartner Group Learning course that is considered to be a prerequisite of this course.				
68	**IBM DB2 Administration Essentials**	COURSE OVERVIEW: IBM's DB2 offers a powerful approach to database management with integrated object-relational multimedia capabilities and sup-	4 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		port for the industry's leading platforms today. The IBM DB2 Administration Essentials course teaches the student how to perform basic database administration tasks using IBM DB2. It covers the basics of database administration using IBM DB2. This course is one of two covering IBM DB2 database administration. The other course, IBM DB2 Advanced Administration, should be taken after completing this one. Both of these courses must be completed to prepare the student to take the IBM Exam 504 - DB2 UDB Database Administration. There are a total of five courses in this curriculum. IBM DB2 Server Fundamentals, IBM DB2 Administration Essentials, IBM DB2 Advanced Administration, IBM DB2 Basic Application Development, IBM DB2 Advanced Application Development. This course is intended for anyone who plans, implements, or maintains databases. This would include people who work as application developers, data managers, and information specialists. PREREQUISITES: Users taking this course should possess excellent computer skills. They should have experience of databases and SQL, as well as a strong knowledge base in areas such as basic database principles, basic data design, and modeling. They should also take the foundation course, IBM DB2 Server Fundamentals, developed by Gartner Group Learning, prior to taking this course. In addition, Fundamentals of SQL is another Gartner Group Learning course that is considered to be a prerequisite of this course.				
69	**IBM DB2 Advanced Admini-**	COURSE OVERVIEW: IBM's DB2 offers a powerful ap-	4 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
	stration	proach to database management with integrated object-relational multimedia capabilities and support for the industry's leading platforms today. The IBM DB2 Advanced Administration course provides the training necessary for student to perform database administration tasks using IBM DB2. These tasks include monitoring DB2 activity, recovering databases, and troubleshooting problems. This course is one of two covering IBM DB2 database administration. It covers the basics of database administration using IBM DB2. The other course, IBM DB2 Administration Essentials, should be taken before completing this one. Both of these courses must be completed to prepare the student to take the IBM Exam 504 - DB2 UDB Database Administration. There are a total of five courses in this curriculum. IBM DB2 Server Fundamentals, IBM DB2 Administration Essentials, IBM DB2 Advanced Administration, IBM DB2 Basic Application Development, IBM DB2 Advanced Application Development. This course is intended for anyone who plans, implements, or maintains databases. This would include people who work as application developers, data managers, and information specialists. PREREQUISITES: Users taking this course should possess excellent computer skills. They should have experience of databases and SQL as well as a strong knowledge base in areas such as basic database principles, basic data design, and modeling. They should also take the foundation course, IBM DB2 Server Fundamentals, developed by Gartner Group Learning, prior to taking this course. In addition, Fundamentals of SQL is another Gartner				

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		Group Learning course that is considered to be a prerequisite of this course.				
70	**IBM DB2 Server Fundamentals**	COURSE OVERVIEW: IBM's DB2 offers a powerful approach to database management with integrated object-relational multimedia capabilities and support for the industry's leading platforms today. The IBM DB2 Server Fundamentals course introduces the student to the fundamentals of DB2. It outlines the steps necessary to install DB2 Universal Server Version 5, describes how to control data access, and implement database objects and concurrency. This course acts as a foundation course for the other four courses in this curriculum. Therefore, this course should be taken before taking any of the following Gartner Group Learning courses: IBM DB2 Administration Essentials, IBM DB2 Advanced Administration, IBM DB2 Basic Application Development, IBM DB2 Advanced Application Development. This course is intended for anyone who plans, implements, or maintains databases. This would include people who work as application developers, system or database administrators, data managers, and information specialists. PREREQUISITES: Users taking this course should possess excellent computer skills. They should have experience of databases and SQL. In addition, Fundamentals of SQL is a Gartner Group Learning course which is considered to be a prerequisite of this course.	4 hours	How to Do	Candidate	IM
71	**Using INFORMIX-SQL**	COURSE OVERVIEW: This course is designed for those who need to learn INFORMIX-SQL in the fastest, most economical way possible. The course com-	6 to 8 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		bines a hands-on tutorial with a 200+ page workshop for additional learning and reinforcement. Students will learn the basic concepts of SQL and how to construct simple and complex queries. They will also learn how to define and use tables, views, and indexes. Adding, updating, and deleting rows are also covered. PREREQUISITES: None.				
72	**Using INFORMIX-SQL**	COURSE OVERVIEW: This course is designed for those who need to learn INFORMIX-SQL in the fastest, most economical way possible. The course combines a hands-on tutorial with a 200+ page workshop for additional learning and reinforcement. Students will learn the basic concepts of SQL and how to construct simple and complex queries. They will also learn how to define and use tables, views, and indexes. Adding, updating, and deleting rows are also covered. PREREQUISITES: None.	6 to 8 hours	How to Do	Candidate	IM
73	**Advanced INFORMIX-SQL**	COURSE OVERVIEW: This is an advanced course designed to follow Using INFORMIX-SQL. It deals in more detail with concepts presented in Using INFORMIX-SQL as well as introducing new material such as transaction controls, stored procedures, and triggers. PREREQUISITES: Using INFORMIX-SQL course, or equivalent knowledge and experience.	6 to 8 hours	How to Do	Candidate	IM
74	**INFORMIX-**	COURSE OVERVIEW:	4 hours	How to	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
	OnLine Dynamic Server Management and Optimization	The Managing and Optimizing INFORMIX-OnLine Dynamic Server course presents the features of INFORMIX-OnLine dynamic server. It covers the various methods that you can use to manage and optimize OnLine dynamic server. The audience for this course is database administrators and users who need to support and leverage the INFORMIX-OnLine Dynamic Server database. After completing this course, you will be able to list the features of INFORMIX-OnLine Data Storage; manage data access; ensure data integrity; list advanced management issues. PREREQUISITES: Students taking this course should have a basic understanding of database design principles. Some DBA experience with a large client-server or enterprise database would be helpful.		Do		
75	**Database Design and Manipulation with Microsoft SQL Server 6.0**	COURSE OVERVIEW: The Database Design and Manipulation with Microsoft SQL Server 6.0 course defines terminology and introduces the student to the design of the databases. The student will learn how to create databases, devices, and tables according to storage needs and constraints. Upon course completion, the student will know how to retrieve and modify specific data by using the Transact-SQL component of SQL Server 6.0. This course is designed for database developers, client/server developers, programmer/analysts, database administrators, and system administrators. Material presented in this course, and the subsequent course Database Implementation with Microsoft SQL Server 6.0, will prepare students for the Microsoft Exam (70-027), Implementing a Database Design on Microsoft SQL Server 6.0.	2 days	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		PREQUISITES (REQUIRED): The student should have experience using the Microsoft Windows operating system and a basic understanding of relational database theory.				
76	**Data Modeling**	COURSE OVERVIEW: The Data Modeling course is the first step of the top-down database development process and is performed during the strategy and analysis stages of the system development cycle. The goal is to develop an entity relationship (E-R) model that represents the information requirements of the business. In this course you will learn how to distill large amounts of information into more concise "business rules," concisely diagram those rules, and then validate them by reading them back to the users. The course shows how an E-R model can be easily mapped to a relational database design. The audience for this course is managers, application developers, database administrators and technical support. After taking this course, the user will have learned the following: how to identify entities, relationships, attributes, and unique identifiers from business specifications; how to develop an entity-relationship (E-R) diagram to model the entities, relationships, attributes and unique identifiers; how to normalize the data load; how to model advanced relationships; how to identify and model subtypes and supertypes; how to map an E-R diagram to a relational database design. PREREQUISITES: Understanding Relational Databases is recommended. Using SQL*Plus is also recommended for individuals who do not have extensive SQL knowledge.	6 to 8 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
77	**Develop PL/SQL Applications**	COURSE OVERVIEW: The Develop PL/SQL Applications Course is designed for programmers, programmer/analysts, system developers, and other information technology professionals who require an in-depth knowledge of PL/SQL. Upon course completion, students will be able to develop and debug PL/SQL programs that: access and manipulate an Oracle database; use branching and loops to control data processing; raise and handle exceptions; and use implicit and explicit cursors. PREREQUISITES: Introduction to the Oracle World; Work in the SQL*Plus Environment or equivalent knowledge Software Requirements: Oracle7 with transaction processing option; SQL*Plus version 3.1; PL/SQL version 2.0, or Oracle 6 with transaction processing option; SQL*Plus version 3.0; PL/SQL version 1.0	1-2 days	How to Do	Candidate	IM
78	**Function Modeling**	COURSE OVERVIEW: The Function Modeling course teaches students how to analyze business functions and model those functions using function hierarchy diagrams. It relates function hierarchies to data flow diagrams, and introduces the crosschecking of diagrams to ensure accuracy in application design. The audience for this course is key users, managers, systems analysts and application developers. After taking this course, the user will have learned the following: how function modeling fits into the system development process; how to apply the basic concepts of function modeling; how to analyze business activities and develop function models using function hierarchy diagrams; how to model functions based on events and triggers; how	6 to 8 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		to cross-check Functions with the Information Model; how to develop a Context Diagram and a Level 1 data flow diagram for a business; how to use a data flow diagram to cross-check a Function Model and an Information Model; how to analyze variables that impact business functions; how to define the relationship between functions and application lessons. PREREQUISITES: Understanding Relational Databases is recommended. Using SQL*Plus would be helpful for individuals who do not have extensive SQL knowledge. A review of the Data Modeling course may be useful as well.				
79	**Maintain Optimal Database Performance**	COURSE OVERVIEW: The Maintain Optimal Database Performance course is designed to teach application developers and database administrators how to keep an Oracle7 database running at optimal efficiency. Upon successful completion of this course, students will be able to perform the following tasks: select effective indexes; decide between the rule-based and the cost-based optimization approach; use Explain Plan, SQL TRACE, and tkprof to analyze execution plans for a SQL statement; configure Oracle for optimal use of system resources; place data and index objects for optimal retrieval; tune checkpoints; and tune the SGA. PREREQUISITES (REQUIRED): completion of the following Gartner Learning courses or equivalent knowledge: Introduction to the Oracle World; Work in the SQL*Plus Environment; Understand Oracle7 Architecture; and Perform Routine DBA Tasks. Recommended: Design Oracle Databases and Create & Configure	2 days	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		Oracle Databases.				
80	**Perform Routine DBA Tasks**	COURSE OVERVIEW: The Perform Routine DBA Tasks course is designed especially for database administrators who want to learn more about space management, user management, data security, and backup and recovery. Upon course completion, students will be able to perform the daily tasks necessary for the reliable operation of an Oracle7 database including: starting up and shutting down the database under a variety of circumstances; allocating appropriate storage for data objects; understanding different types of failure and how to recover from them; backing up the database for maximum performance; archiving; managing users, privileges and database security; using roles to simplify granting system and object privileges; and understanding object dependencies. PREREQUISITES: Understanding of your operating system, especially the file system; Introduction to the Oracle World; Work in the SQL*Plus Environment; Design Oracle Databases; Understand Oracle7 Architecture or equivalent knowledge. Software Requirements: Students will need: a computer with Oracle7 installed; an operating system account; an Oracle account with full administrative privileges	2 days	How to Do	Candidate	IM
81	**Programming with PL/SQL**	COURSE OVERVIEW: The Programming with PL/SQL course introduces application developers to the constructs and syntax of PL/SQL. You will learn about PL/SQL blocks and the various functions of PL/SQL programming. The audience for this course is application developers, programmer/analysts, systems analysts, system designers, database	4 to 6 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		administrators, technical support personnel and CASE designers/developers. After taking this course, the user will have learned the following: how PL/SQL works within the Oracle environment; PL/SQL blocks; how to declare and use variables and constants in PL/SQL; how to use variables in SQL statements; how to write transaction processing statements; how to implement conditional and iterative control structures in PL/SQL programs; how to develop applications that use cursors to manipulate data from multiple row SELECT statements; how to use PL/SQL exception handling functions. PREREQUISITES: Knowledge of SQL and a Procedural Programming Language such as C.				
82	**Work in the SQL*Plus Environment**	COURSE OVERVIEW: The Work in the SQL*Plus Environment course is designed for application developers, systems analysts, programmers, DBA's, project managers and other information technology professionals who use SQL and SQL*Plus to interact with an Oracle7 database. Upon course completion, students will be able to: retrieve data from the database using the SELECT statement; retrieve data from multiple tables; use SQL*Plus commands to work with the SQL*Plus buffer and control the execution of SQL statements; use SQL*Plus formatting commands to format query output; examine the structure of data objects by querying the data dictionary; create tables, views, synonyms and constraints using SQL DDL; insert, update and delete data using SQL DML. PREREQUISITES: Introduction to the Oracle World	2 to 3 days	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		or equivalent knowledge. Software Requirements: Oracle7; SQL*Plus 3.1 or Oracle 6; SQL*Plus 3.0				
83	**Introduction to Relational Databases and SQL**	COURSE OVERVIEW: This is a short course designed to provide a high level overview of relational databases and SQL. In less than two hours the student will familiarize himself with the basic concepts. This course is an excellent primer for the new user. PREREQUISITES: None.	2 to 3 hours	How to Do	Candidate	IM
84	**Introduction to SQL**	COURSE OVERVIEW: The Introduction to SQL course is designed to provide a high level overview of SQL. It is an excellent primer for the new user. This course teaches you the basics of accessing SQL*Plus. This course will also teach you how to create and modify tables, including which commands to use for altering and deleting table data. You will also learn how to query data in tables, as well as how to format and retrieve the desired data. The aim of this course is to provide a complete introduction to the basic concepts and commands in SQL. PREREQUISITES: None.	2 to 3 hours	How to Do	Candidate	IM
85	**Introduction to the Database World**	COURSE OVERVIEW: The Introduction to the Database World course is designed for managers, users and other information technology professionals who require an overview of database systems, their structures and capabilities. Topics covered include Components of the Database World, Types of Database Management Systems, Underlying Structures and Mechanisms, Functions of Database Personnel, and Emerging Database Applications. This course was developed in con-	8 hours	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		junction with Dr. Edgar F. Codd, founder of the Relational Model.				
86	**Logical Database Design**	COURSE OVERVIEW: The Logical Database Design course is designed for those who need to learn how to design a relational database using database design models and principles that will fit a database to the data it will hold. They will learn how to develop entity-relationship specifications for the database and translate this into tables. The course also discusses ways to reduce data redundancy and methods to "tune-up" designs achieved with logical design. PREREQUISITES: Understanding Relational Databases is recommended. Familiarity with SQL is helpful.	10 to 12 hours	How to Do	Candidate	IM
87	**Designing a Data Warehouse**	COURSE OVERVIEW: The Designing a Data Warehouse course is a technical user course from Gartner Learning. Upon successful completion of the course, the student will be able to plan, design, build, and administer a data warehouse. The audience for this course is IT professionals and database administrators who need to plan, design, build, and administer the data mart warehouse. PREREQUISITES: Students should have a basic understanding of database design principles plus DBA experience with a large client/server or enterprise database.	4.5 hours	How to Do	Candidate	IM
88	**Advanced Networking with Windows NT Server 3.51**	COURSE OVERVIEW: The Advanced Networking with Windows NT Server 3.51 course demonstrates data protection; the integration of Windows NT Server with MS-DOS, Novell NetWare, and Apple Macintosh; the optimization of Windows NT Server re-	2 days	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		sources and performance; the implementation of TCP/IP in a Windows NT Server environment; and the use of diagnostic features to remedy common problems. This course is designed for network administrators, system administrators and help desk technicians. The material and activities in this course, together with the Basic Networking with Windows NT Server 3.51 course, will prepare students for the Microsoft Windows NT Server Exam (70-43). PREREQUISITES: The Basic Networking with Windows NT Server, Installation and Configuration of Windows NT Workstation and Networking Windows NT Workstation courses; and passed the Microsoft Exam 70-42 (Windows NT Workstation).				
89	**Microsoft Windows NT Server 4.0 Administration**	COURSE OVERVIEW: The Microsoft Windows NT Server 4.0 Administration course provides students with information necessary for facilitating the administration of NT Server, managing and organizing shared network resources, and tracking system events. This course is designed for systems engineers in a simple computing environment who install, configure, implement and support Windows NT 4.0 in a single domain environment. Upon completing this course, students will be able to: implement an export server and an import computer; use License Manager, Scheduler Service, Messenger and Alerter Services and Spooler Services; manage disk resources; install and configure a printer; implement a printer pool; configure various clients and administer remote services; configure file and print sharing devices; manage AppleShare volumes.	1 day	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		The materials and activities in this course, together with the Microsoft Essential Networking, Microsoft Windows NT Server 4.0 Maintenance, Microsoft Windows NT Server 4.0 Networking, Microsoft Windows NT Server 4.0 Security and Microsoft Windows NT Server 4.0 Installation courses, will prepare the student for the Implementing & Supporting Microsoft Windows NT Server 4.0 Exam (70-67). PREREQUISITES: Students taking this course should have taken Gartner Learning's Microsoft Windows NT Workstation 4.0 Essentials and Microsoft Windows NT Workstation 4.0 Networking or Using Windows NT Workstation 4.0. Also, Microsoft Windows NT Server 4.0 Installation and Microsoft Windows NT Server 4.0 Security.				
90	**Microsoft Windows NT Server 4.0 Networking**	COURSE OVERVIEW: The Microsoft Windows NT Server 4.0 Networking course prepares students for installing, configuring, implementing, and supporting a Windows NT 4.0 single domain networking environment. This course was designed for systems engineers in a simple computing environment who install, configure, implement and support Windows NT 4.0 in a single domain environment. Upon completing this course, students will understand: distribution and file and print sharing; configuring network adapters and protocols; configuring Network Services, Remote Access Service, and RAS Clients; configuring NT Server for NetWare. The materials and activities in this course, together with the Microsoft Essential Networking, Microsoft Windows NT Server 4.0 Administration, Microsoft Windows NT	1 day	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		Server 4.0 Installation, Microsoft Windows NT Server 4.0 Maintenance and Microsoft Windows NT Server 4.0 Security courses, will prepare the student for the Implementing & Supporting Microsoft Windows NT Server 4.0 Exam (70-67). PREREQUISITES: Students taking this course should have taken Gartner Learning's Microsoft Windows NT Server 4.0 Installation, Microsoft Windows NT Server 4.0 Administration, Microsoft Windows NT Server 4.0 Maintenance and Microsoft Windows NT Server 4.0 Security.				
91	**Microsoft Windows NT Server 4.0 Security**	COURSE OVERVIEW: The Microsoft Windows NT Server 4.0 Security course offers a robust security model that includes U.S Government C2-level security at the desktop and server level. NT Server provides comprehensive tools such as System Policy Editor, to help system administrators efficiently manage and maintain users' desktops from a central location. Upon completing this course, students will be able to manage user and group accounts, policies and profiles; and assign shares and permissions in a single-domain environment. The materials and activities in this course, together with the Microsoft Essential Networking, Microsoft Windows NT Server 4.0 Administration, Microsoft Windows NT Server 4.0 Networking, Microsoft Windows NT Server 4.0 Maintenance and Microsoft Windows NT Server 4.0 Installation courses, will prepare the student for the Implementing & Supporting Microsoft Windows NT Server 4.0 Exam (70-67). PREREQUISITES:	1 day	How to Do	Candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		Experience using Microsoft Windows interface, an understanding of the Microsoft DOS Operating System and PC hardware, an understanding of basic network functions and terminology, experience supporting end users and networks.				
92	**UNIX System for Administration Essentials**	COURSE OVERVIEW: This graphics-based CBT course is a generic system administration course teaching the student how to effectively manage UNIX SVR4 systems. The skills acquired by this course will enable the student to startup (boot) and shutdown the UNIX system, to manage users and their environment, to manage system and user processors, and to design and implement system backup and restore procedures. PREREQUISITES: UNIX User Essentials and UNIX Advanced User. In addition a general working knowledge of the UNIX operating system would be helpful.	4 to 6 hours	How to Do	Candidate	IM
93	**UNIX System Administration Files**	COURSE OVERVIEW: This graphics-based CBT course is a generic system administration course teaching the student to effectively set up, maintain, and manage disk partitions and file systems in a SVR4 UNIX system. PREREQUISITES: UNIX User Essentials, UNIX Advanced User, UNIX vi Editor Essentials.	4 to 6 hours	How to Do	Candidate	IM
94	**UNIX System Administration I (for UNIX SVR4)**	COURSE OVERVIEW: The UNIX System Administration I (for UNIX System V Release 4) course is designed for experienced UNIX users and new UNIX system administrators who will be responsible for managing the resources provided by a UNIX system. Topics covered include Running the System, Getting Users Started,	3 days	How to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		Communication Services and Routine Tasks.				
95	**UNIX System Administration II (for UNIX SVR4)**	COURSE OVERVIEW: The UNIX System Administration II (for UNIX System V Release 4) course is a comprehensive training package for UNIX system administrators who need to perform advanced administrative tasks on UNIX System V Release 4 systems. Picking up where UNIX System Administration I (for UNIX System V Release 4) left off, this course teaches the more experienced system administrator how to accomplish more advanced administration tasks, such as configuring the system to properly reflect available devices, tuning the system for maximum performance, and creating and maintaining file systems. Upon completing this course, students will be able to: configure the system; tune the system for optimal performance; add and delete devices; add, monitor, and maintain file systems; partition and slice disks; and troubleshoot common system problems. PREREQUISITES: Introduction to the UNIX World; the UNIX System for Users; More of the UNIX System for Users; the UNIX System for Advanced Users; UNIX System Administration I (for UNIX SVR4) or equivalent knowledge.	3 days	How to Do	Candidate	IM
96	**Security for the UNIX System**	COURSE OVERVIEW: The Security for the UNIX System course is designed for UNIX system users and administrators who need to make their accounts, files and systems more secure. Topics covered include Security Aspects of Files and Permissions, Security Aspects of Commands, and Password and Terminal Security.	4 days	How to Do	Candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
	The Heinz School Carnegie Mellon University					
97	**Management Information Systems** **90-728**	Government and nonprofit organizations are data intensive, service-oriented entities that rely increasingly on computerized databases. The first part of this course provides a grounding in the relational database model and an introduction to microcomputer database management systems. Students will gain experience using Microsoft's Windows-Based Access DBMS for design of data entry forms, files, reports, and queries; and for programming custom features. The second part of the course provides a framework and methods for project design and management, with a focus on information systems. The framework is the well-established life cycle for systems analysis and design including feasibility studies, analysis of user requirements, systems design, implementation, and maintenance. Corresponding tools include various flowcharts, work breakdown structures, data dictionaries, etc. Students will analyze and design systems in a project, and build Access prototypes for the systems.	Semester	How to Do	Candidate	IM
98	**Computing and Organization** **90-741**	This is a case-based course which will introduce the students to the various ways in which the power of advanced information technology is being harnessed in modern organizations. The main objective of this course is to sensitize the students of MIS to balance their traditional technical expertise with humanistic considerations. The course will have two predominant themes: informed critiques and contemporary issues in practice. The critical theme will introduce students to the variety of perspectives that may guide the design and use of information technology in modern organizations. It will pro-	Semester	What to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		vide students with the conceptual tools not only to understand the fundamentals of contemporary management practices in the IS arena but also analyze and evaluate any current and future management "buzzwords" that may come along in their professional careers. This theme should provide the foundation for analyzing the practical issues brought up in the other theme. The practical aspect of the course will introduce students to the variety of social and economic issues that are emerging out of the applications of IT in organizations. The practical issues covered will include the role of IT in enabling radical organizational transformation (Business Process Reengineering), facilitating continuous improvement (Learning Organizations) and fostering new organizational forms (Virtual Corporation, Electronic Markets). Topics of discussion will include understanding what each of these phenomena really mean, their practical implications and their related implementation challenges.				
99	**Electronic Commerce** **90-742**	The Internet is being touted as a revolutionary new medium for business. Electronic commerce, as the fastest growing facet of the Internet and other component technologies, promises functionality and new ways to doing business that no company can afford to ignore. It is expected to change the way business, governmental and educational institutions operate and the products and services they offer. Moreover, much of what we currently know about these institutions, their management, and operation could be rendered obsolete through this emerging environment.	Semester	What to Do	Candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		In order to get past the hype and take advantage of the Internet's full potential, it is critical that organizations move beyond the obvious elements of this medium, such as advertising on the Web, and respond to a new set of challenges: • What are electronic markets and how does one create and profit from them? • What factors facilitate/inhibit electronic markets and business on the Internet? • Which industries will survive and thrive and which could become endangered? • How can organizations gain a competitive advantage through electronic commerce? • How will the Internet impact functional areas of the organization? • What resources (financial, human, technological) are required to exploit this frontier? This course will be broadly framed around these questions and will provide a foundation for answering them. We will examine the progress and potential impact of the Internet, World Wide Web and other forms of telecommunications technology, on the creation and transformation of goods, organizations and industries. Given the explosive rate of development in this area, our plan is to survey the field with the help of cases, lectures, readings, guest speakers, and get hands-on experience through real-world projects. No prior technical experience is necessary.				
100	**Telecommunications Management** **90-768**	The purpose of this course is to provide students with an understanding of the key technical and managerial issues in the effective development and use of telecom-	Semester	What to Do	Potential candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		munications by organizations. Discussion of technology will be set in the context of applications, particularly those emphasizing inter-organizational coordination and service delivery. Topics covered will include basic concepts of telecommunication technology (data and voice), Internet and Intranet technologies, issues related to the operational and strategic use of the technology, and the changing structure of the telecommunications industry.				
101	**Information Security Management** **90-788**	This course is the overview course to the certificate and information systems security concentration in the I.S. graduate curriculum. The course covers a variety of topics that will prepare those students who wish to develop a skill set in data security administration or who wish to enhance their current information systems expertise by gaining additional knowledge in the field of computer security. The topics to be covered during the semester will range from access control and data classification to cryptography and risk management. Students will also be instructed in how to design and create disaster recovery plans, computer policies and standards, system security architectures and physical security controls. Legal aspects of computer security will also be covered as will auditing in a secured environment and managing as a day-to-day security administrator. In-class projects will focus upon critical thinking for security managers in mainframe, midrange and network environments as well as research assignments and basic policy creation. Guest speakers will also provide additional insight to selected topics during the semester.	Semester	How to Do	Candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
102	**Management of Computer and Information Systems** **90-873**	The purpose of this course is to provide knowledge, skills, and exposure to issues for managing information as an asset and information technology. Students completing this course will be better equipped to be staff members in an Information Systems department, or managers of a functional area(s) engaged in defining and implementing information systems opportunities and solutions. Coursework: A high volume of reading will be required. Besides an essay type midterm and final exam, 4-5 short papers will be assigned. Class participation is solicited and expected. Major topics to be covered include: Information asset management, strategic information systems planning, information services organization issues - critical success factors, personnel selection and management, systems development techniques, a study of competitive advantage systems, computer systems related fraud-security and confidentiality issues, request for proposal development, vendor selection methods, systems implementation and training issues, telecommunications management, and artificial intelligence system development, with pragmatic uses along with management issues, and a review of disaster recovery management in conjunction with governing laws. Case studies will be studied and discussed in order to reinforce the solutions using various forms of information technology. Guest speakers will address their area of specialty and allows students to receive multiple perspectives of information and computer management.	Semester	What to Do	Potential candidate	IM

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		Students will have sufficient knowledge after this course to contribute to system planning, selection, implementation, benefits realization, and protection requirements. Many valuable tools and techniques will be learned which will provide a more sophisticated approach to leveraging organization information providing increased revenue, decreased expenses and increased productivity. The course is valuable for every middle and upper management person due to their reliance on information processing for decision making and operations management.				
103	**Database Management** **90-746**	This course is designed to cover both the theoretical and practical aspects of database management systems. In order to provide an understanding of the evolution of data management, the traditional file organization is compared with network, hierarchical and relational models of data. The theory and practice of languages and design approaches for the relational model are stressed. Specific topics covered will include data modeling, database design using normalization theory and relational query languages, and issues of database security, privacy and integrity. Students in the course will be expected to design and implement a database application using ORACLE.	Semester	How to Do	Candidate	IM

Network Systems Security and Survivability Courses

Naval Post-Graduate School
http://www.nps.navy.mil

104	**CS3600 Introduc-**	This course is concerned with fun-	Semester	How to	Candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
	tion To Computer Security	damental principles of computer and communications security for modern monolithic and distributed systems. It covers privacy concerns, data secrecy and integrity issues, as well as DoD security policy. Security mechanisms introduced will include access mediation, cryptography, authentication protocols, and multilevel secure systems. Students will be introduced to a broad range of security concerns including both environmental as well as computational security. Laboratory facilities will be used to introduce students to a variety of security-related technologies including, discretionary access controls in Class C2 systems, mandatory access controls in both low and high assurance systems, identification and authentification protocols, the use of cryptography in distributed systems, and database technology in trusted systems. PREREQUISITES: Either CS3010, CS3030, or the consent of instructor.		Do		
105	**CS3670 Secure Management of Systems**	This course is intended to provide students with an understanding of management concerns associated with computer-based information systems. Students will examine the security concerns associated with managing a computer facility. The impact of configuration management on system security, the introduction of software that must be trusted with respect to computer policies, environmental considerations, and the problems associated with transitions to new systems and technology will be studied in the context of Federal government and especially DoD ADP systems. PREREQUISITES: CS-3600.	Semester	What to Do	Potential candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
106	**CS3675 Internet Security Resources And Policy**	This course covers the threats currently facing organizations that access the Internet, the technological basis for such threats and policy options for dealing with such threats. The course is designed to involve students directly in the composition of meaningful security policies. Lab exercises will be used to improve the student's detailed knowledge of security threats and of the options for dealing with such threats. PREREQUISITE: None.	Semester	How to Do	Candidate	NSS
107	**CS3680 Building Defensible Computer**	This course will focus on the threats to computer systems. External attacks, malicious artifacts, such as Trojan Horses, and techniques to eliminate or contain them will be addressed. Assurance methods to create trusted computing bases for both monolithic and distributed systems will be presented. Leveraging high assurance policy enforcement mechanisms in the design of applications will be discussed. System architecture considerations, the application of information security policies in networked systems, the importance of cryptographic methods of communication in distributed systems, and critical topics in database security will be presented. Demonstrations, exercises and experiments with techniques for achieving defensible computer systems will be presented. Building applications for trusted systems will be addressed. Students will examine the use of COTS product to meet system security requirements. Students will gain hands-on experience with methods for distributed identification and authentication and various uses of cryptography as it complements trusted systems. PREREQUISITE:	Semester	How to Do	Candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		CS3600.				
108	**CS3690 Applying INFOSEC Systems**	This course presents an integrated view of INFOSEC disciplines in the context of today's dynamic threat environments. It will present security standards, certification, and accreditation as they relate to the management of risks and INFOSEC techniques. Students will learn about several current security policies and will study scenarios where these policies may be silent or ambiguous. Mandatory, discretionary, commercial and dissemination policies will be addressed. Life cycle issues for INFOSEC systems and organizational impacts on security will be presented. System changes that potentially impact security will be presented such as increased threats or risks, security breaches, hardware changes, policy changes, and environmental factors. PREREQUISITE: CS3600.	Semester	What to Do	Candidate	NSS
109	**CS4600 Secure Computer Systems**	The course covers implementation of protection domains for both monolithic and distributed secure systems. The importance of system architecture to assurance methodologies for security kernels will be emphasized. Topics will include the use of protection hardware, the implementation of virtual machines through the effective use of memory management techniques including segmentation and paging, synchronization mechanisms, critical sections, software engineering methodologies as applied to the development of secure computer systems, and configuration management techniques. Critical topics in database security will be discussed. PREREQUISITE: CS3450, CS3502, CS3600.	Semester	What to Do	Candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
110	**CS4603 Database Security**	The course covers the logical associated with database security. Policies for integrity and confidentiality of information will be reviewed in the context of database systems. Modeling of secure database systems will be covered along with implementation issues including atomicity, serialization, and view-based control. Releaseability issues in secure database design will be addressed. Security in statistical databases will be addressed along with security approaches for object oriented databases. Novel approaches to the collection and use of audit databases will be addressed including intrusion detection. PREREQUISITE: CS3600, CS3320, CS3450 or consent of instructor.	Semester	What to Do	Potential candidate	NSS
111	**CS4605 Security Policies, Models And Formal Methods**	The course covers the methods used to specify, model, and verify computational systems providing access control. The identification of the security policy and its interpretation in terms of a technical policy for automated systems is covered. Informal and formal security policy models are discussed and several access-control models are explored including information-flow models, the Access Matrix Model, the Bell and LaPadula Model, nondeducibility, and noninterference policy expressed in terms of the entities on a computer is reviewed. Formal models and proof of their correctness provide the bridge between a written statement of security policy and the implementation of a particular secure system. Topics include access control, information flow, safety, verification. Verification methods will be discussed.	Semester	What to Do	Potential candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		PREREQUISITES: MA3025, MA3030, CS3600, CS3651.				
112	**CS4614 Advanced Topics In Computer Science**	This course covers advanced topics in software, communications, and data security. Military and commercial information security and integrity policies will be studied, software and hardware subversions of computer systems; advances in operating system, databases and network security, evaluation criteria for secure systems, modal logic and linear and branching-time temporal logics, cryptographic and authentication protocols and techniques for implementing supporting policies. PREREQUISITES: CS3600, CS4600, and CS4605 or consent of instructor.	Semester	What to Do	Potential candidate	NSS
113	**IW2000 Introduction To Information Warfare**	This course explores the basic five pillars of the IW Command & Control Warfare elements of Information Warfare. It will introduce entering IW students to these five areas of Psychological Operations (PSYOP), Deception, Operational Security (OPSEC), Electronic Warfare, and Physical destruction. It provides a foundation of understanding to the entire field of Information Warfare along the time line of peace, to conflict, and back to cessation of hostilities. An overview of Systems Engineering is the framework for understanding the technologies underlying Information Warfare. PREREQUISITE: None.	Semester	What to Do	Potential candidate	NSS
114	**IS3504 Modern Network Operating Systems: Planning, Technology And Operations**	This course focuses on the planning, design, installation, configuration and management of network operating systems used throughout DoD and private industry. Network operating systems are compared	Semester	How to Do	Candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		with single user operating systems to understand differences and similarities. Popular client/server and peer-to-peer systems are examined to provide a thorough understanding of the correct applications of each. Network labs provide in-depth analysis of such topics as file server configuration and administration, multi-level network security procedures and global file server synchronization processes. PREREQUISITE: Computer Networks: Wide Area/Local Area (IS3502). Security Classification: None.				

Information Resource Management College
http://www.ndu.edu/irmc/ home page
http://www.ndu.edu/ndu/irmc/academic_programs.html catalog

No.	Course Title	Brief Description	Duration	How-to-do(H)/ What-to-do(W)	Distance Learning Candidacy	Domain
115	**Managing Information Security in a Networked Environment (SEC)**	COURSE DESCRIPTION: Provides an executive-level perspective on protecting computer-based information in a modern networked environment. The course covers a wide range of topics including basics of information security, the nature of the threat, computer crime, trusted systems, network security technology, encryption, electronic commerce and the Internet, legal and privacy issues, infrastructure security, and emerging security technologies. The course also addresses strategies for developing a sound security policy and defines the role of management in promoting employee security awareness and performing risk analysis. Case studies, demonstrations, hands-on exercises and guest speakers are used to enhance classroom discussions. RECOMMENDED ATTENDANCE:	5 Days	How to Do	Candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		This course is appropriate for functional and technical managers who require a good foundation in the threats to security of information in a networked environment and emerging methods for countering those threats. The course is recommended for civilian grades GS/GM 12-15 and military grades O-4 to O-6. COURSE GOAL: The goal of the course is to acquaint the student with the major issues involved in ensuring security for computer-based information and to provide the foundation for developing the infrastructure, policies and procedures to safeguard it. COURSE OBJECTIVES: The objectives of the course are to raise awareness about the issues involving information security among functional and information resource managers; to explore the manager's role in establishing information security policy; and to provide a foundation for making enlightened decisions and tradeoffs concerning the technological, legal and procedural aspects of protecting information in an open, networked environment.				
116	**New World of the CIO (NWC)**	COURSE DESCRIPTION: Provides a broad-based summary of duties of a Chief Information Officer. Using recent legislation as a backdrop, the course examines both explicit and implicit functions of the CIO. The primary focus is on how these laws, as well as current policy and best business practices should be applied when planning, acquiring, managing, and using information resources. Set in the context of an increasingly and dynamic global environment, the course provides a comprehensive examination of information man-		What to Do	Potential candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		agement in the Federal Government with emphasis on the increasing dependency of the agency on information technology as the primary means of improving mission performance and service delivery while sustaining budget and staffing reductions. RECOMMENDED ATTENDANCE: The course is appropriate for all persons whose principle duties are those of a Chief Information Officer or who work on the CIO staff of an organization. It is intended for civilians in grades GS/GM 13 through 15 and military in grades O4 through O6. COURSE GOAL: The goal of the course is to provide a solid foundation for making improved policy and business decisions when acquiring, managing, and using information resources to improve mission and program performance. COURSE OBJECTIVES: The objectives of this course are to assess the impact of the latest legal and policy changes on information management in the Federal Government and to assess the role of a CIO in promoting and using information technology as a means of improving an agency's mission performance and service delivery.				
117	**Distance Courses**	Information Highway IT Capital Planning Measuring Results of Organizational Performance Collaborative Technologies and Organizational Learning			Candidate	NSS
	Defense Information Systems Agency (DISA) http://www.disa.mil/infosec/cbtdown.html					
118	**INFOSEC-101 for End Users**	COURSE DESCRIPTION: This course provides a basic introduction to: major categories of	1 day	What to Do	Candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		threats and vulnerabilities; common examples of computer abuse; common systems vulnerabilities, good information system security practices; explains when audit trails are mandatory; basic malicious logic; basic concepts of contingency planning; goals and policy governing the automated information system environment; and gives a basic knowledge of responsibilities toward protecting information systems resources.				
119	**INFOSEC for Managers** **INFOSEC-201**	(Self-Extracting Executable File - Size: 774 KB) This is a PowerPoint file.	1 day	What to Do	Candidate	NSS
120	**Malicious Logic** **INFOSEC-205**	(Self-Extracting Executable File - Size: 717 KB) This is a PowerPoint file.	1 day	What to Do	Candidate	NSS
121	**INFOSEC for Information Systems Security** **INFOSEC-300**	COURSE DESCRIPTION: This course focuses on: Information Systems Security Policies; roles and responsibilities; modes of operations; basic concepts of risk management; contigency planning; certification and accreditation; Internet, work connectivity; access controls; auditing; Computer Security Technical Vulnerability Reporting Program (CSTVRP); Trusted Computer Systems practices, procedures, and concepts; malicious logic; network security; basic concepts of cryptography; and computer crime.	5 days	What to Do	Candidate	NSS
122	**Windows NT Security for System Administrators** **INFOSEC-310**	COURSE DESCRIPTION: This course enables the student to identify the elements of Windows NT Security. This course provides the student with the tools and skills necessary to secure a Windows NT operating environment; will explore real world Windows NT security scenarios and recommended fixes; and will focus on C2 security compliance requirements and achieving level two system admin-	5 days	How to Do	Candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		istrator licensing requirements within DISA. PREREQUISITES: 1. Currently performing system administrator duties on a full time basis to meet job and/or position description requirements. 2. A thorough working knowledge of Windows NT.				
123	**Information Systems Security Basics** **5220.22 (DODSI Course)**	COURSE DESCRIPTION: This course provides practice in fundamental computer security skills to support the protection of information and information systems in the Department of Defense. Given modules on instruction, practical exercises, a technical laboratory environment, and a library of reference materials, the student will be able to: explain the threat to and vulnerabilities of information systems and employ appropriate security countermeasures to manage threat and minimize vulnerabilities; identify required physical, personnel, and procedural security procedures for information systems; and describe the elements of the information systems accreditation process. To enhance their job performance in the workplace, students will be given a "Security Information Technology User's Package" (SITUP), a collection of regulations, references, handbooks, newsletters, training aids, and agency points-of-contact.	5 days	How to Do	Candidate	NSS
124	**Operational Information Systems Security** **ND-225**	COURSE DESCRIPTION: This course provides the student with the basic tools and concepts required to: Implement and maintain an Information Systems Security (INFOSEC) program; understand the need for INFOSEC; roles and responsibilities; modes of operations; risk management; trusted systems; identification and authentication access controls; mitigating	5 days	What to Do	Candidate	NSS

Information Technology Courses

No.	Course Title	Brief Description	Duration	How-to-Do (H)/What to Do (W)	Distance Learning Candidacy	Domain
		risk of equipment and storage media; malicious code; audit trails; PC and UNIX vulnerabilities; and network security.				
125	**Introduction to the DITSCAP** **INFOSEC-315**	COURSE DESCRIPTION: This overview course presents the recently approved Department of Defense Information Technology System Certification and Accreditation Process (DITSCAP) as defined in DOD 5200.40. The course offers an overview of the entire DITSCAP, then focuses on each of the phases, with detailed comments on the activities, tasks, and steps within each of these phases. The course focuses on the DOD approach and is not service specific. One module is dedicated to describing the Roles & Responsibilities contained in the DITSCAP. Modules also cover Risk Management, Security Test and Evaluation, Contingency Operations, and C&A Team organization. Each student receives a diskette with sample templates and documents. The course is not a detailed "how-to" on doing certification and accreditation, but it offers insight into the transition from previous methodologies to the approved process. PREREQUISITES: Duty position of ISSO/ISSM, DAA, Certifying Agent, or Program Management working C&A issues (statement to that effect in block 18 on the 1556); ISSO course (e.g., INFOSEC-300 or ND-225) strongly recommended.	2 days	What to Do	Candidate	NSS

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ABSTRACT (MAXIMUM 200 WORDS)

THIS REPORT PROVIDES AN OVERVIEW OF INSTRUCTIONAL SYSTEMS DESIGN AND ITS IMPLICATIONS FOR ANALYZING CURRICULA IN THE FIELDS OF INFORMATION MANAGEMENT AND NETWORKED SYSTEMS LONGEVITY. MEASURABLE BENCHMARKS FOR ASSESSMENT OF TRAINING AND EDUCATIONAL RESOURCES ARE OFFERED IN ORDER TO FULLY ILLUSTRATE HOW TO PERFORM INSTRUCTIONAL GAP ANALYSIS. THIS REPORT ALSO ADDRESSES ISSUES OF INSTRUCTIONAL APPROACHES AND METRICS, PERFORMANCE OBJECTIVES, EDUCATIONAL MEASUREMENT, AND MISSION VS. LEARNING OBJECTIVES, AND INCLUDES A SELECTED LISTING OF RELATED COURSEWORK IN THE APPENDICES.

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