

## CENTER FOR INFORMATION INTEGRITY RESEARCH

**Subject:** Course Structure for Information Integrity Program Stream- First Exercise

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### I\*I PROGRAM DESIGN

**Key Words:** I\*I Knowledge, Theory, Technology, Techniques, Management, Applications

1. Managing in a Complex World
2. Information and Information System Models for Complex and Changing Business Environments
3. Uncertainty in Information System and its IS modeling implications
4. Theory of Errors and Error Reduction as a Systems problem
5. Analytical Framework for Defining and Achieving Information Integrity
6. Software Practices, Standards and Guidelines – review of Current practices
7. Systems Standards and Guidelines
8. Software Integrity Engineering – Systems approach to developing Information Integrity Technology
9. Analytical Framework for Defining Information Integrity
10. Information Integrity Determinants
11. Elective course in Bioinformatics
12. Elective Course in Biometrics
13. Elective Course – Developing Trust: Online Privacy and Security
14. Testing Web security
15. Elective Course – Impossible Data Ware-house Situations
16. Elective Course: Securing E-Business Systems – a Guide for managers and Executives
17. Advanced Level Course: System Development Control Methods
18. Advanced Level Course: Quality Information Systems
19. Advanced Level Course: Reliability of Computer and Control Systems
20. Advanced Level Course: Safety Critical Computer Systems
21. Selected Topics: Information Integrity Systems
22. Advanced Level Course: Enterprise Knowledge Management – The Information Integrity Approach
23. Advanced Level Course: Issues in Software Engineering

To be continued.....

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# I\*I PROGRAM COURSE DESCRIPTION

## 1. Managing in a Complex World

In this information age, the increased pressure from rapid change and global competition continually pushes business leaders to do *something*. And, so, we do more of what has worked for us in the past or try the new flavor-of-the-month management fad (such as total quality management [TQM], reengineering, benchmarking, knowledge management). Frequently, these actions disrupt the networks of experienced staff who have the knowledge, experience, and connections to make the business successful. Then, instead of increasing effectiveness, leadership actions cause everyone to reconnect and reinvent the wheel or to go underground. Things slow down and leaders become impatient again, feeling the need to do *something more*. The question is “what will be more effective?”

The bottom line is that old-fashioned bureaucracies- commanded and controlled by a few leaders- cannot respond to today’s rate of change with the precision of numerous coherent, intelligent, and self-disciplined agents who self-organize with integrity and overtly control their co-evolution.

Content:

Key complexity concepts; Old and new models, Practical ways to succeed in an evolving web, Limitations of traditional quality and management programs, Developing advantage in a complex business system; Open system versus closed system view of business systems, Significance of information sharing, Criticality of integrity (trust), Management steps to achieve trust advantage; Introduction of evolutionary fitness model; Integrity based complexity advantage evolutionary fitness model; Working in a living system, autonomous agents, leaders, catalysts; New breed of business based on information sharing, integrity, aligning of choices, co-ordination of co-evolution.

**Text Book:** Susanne Kelly and Mary Ann Allison, “The Complexity Advantage”, A Business Week Book, McGraw Hill, 1999.

## 2. Information and Information System Models for Complex and Changing Business Environments

From closed to open systems: the growing importance of information; Information modeled as a function of “source”, of “source” and “process” (medium included), and of “source”, “process” and “recipient”.

Core IS model based on a view of “information” as a “processed data”; Core IS modeled as a decision process comprising stages of forecasting, alternatives and selection; Customer-Supplier Model based IS representation under a closed system view of a business system.

Open system view of a generic business process supply chain comprising informational and physical work systems; Business process IS view modeled as integral to a closed loop information and control system characterized by a multiple stage decision process comprising stages from initial problem recognition (goal setting) and from goal set *obtaining* ‘many factors’ & ‘multiple criterion’ characterizing problem( task) complexity; from multiple criterion *recognizing* (deciding) on operable goal set; from operable goal statement *defining* planning & design constraints and opportunity spaces; from ‘many factor’ information variables characterizing problem complexity *culling out* useful (relevant) information variables; *recognizing* relationships (interdependencies) between culled put information variables; *developing* state transition models defining dynamic behavior of culled out state (information) variables; and undertaking customized planning & design for *generating* alternatives for evaluation and final choice (selection) of customized (flexible) information decision for control implementation.

### **3. Uncertainty in Information System and its IS modeling implications:**

Uncertainty implications of system environmental factors of complexity, change, conversion, communication and corruption (5”C”s) on information system; Uncertainty at plant operations level and at first control level with reference to control of physical variables; Uncertainty due to measurement or observation noise; Uncertainty types due to information overload, lack of standardization, emphasis on integration minimization, and due to errors in hardware, software, data entry, or accidental or intentional failures (including human failures, etc.), i.e., uncertainty due to errors in IS development and implementation life cycle, which are present at all process control levels; Uncertainty types due to incomplete knowledge of system dynamics and due to judgmental errors at human-IS interface at middle management level process controls covering applications such as accounting, work progress monitoring, quality control, assignment problem, inventory control, etc.; Uncertainty types at (a) process control level of higher management decisions covering areas of market forecasting, product development, risk analysis (e.g., with respect to investment decision), manpower forecasting, etc. (these applications being described by decision theory models), and (b) at process control level of senior management decisions covering areas of production and scheduling controls (planning control included) characterized by human-machine systems, which may include humans as part of the process; Uncertainty types present at the level of customized planning and design processes for flexible information decision for continually changing business environment with emphasis on integration maximization across the supply chain; Uncertainty types due to increased complexity as a result of system integration maximization at the levels of plant operation and at process control levels, due to failure of “embedded” systems, due to presence of system interfaces; Uncertainty types at the multistage decision process levels from initial problem recognition (goal setting) to delivery of customized information decision for control implementation.

In the presence of uncertainty as above, modeling the supply chain IS view as a continuous individual information originating and processing situation characterized by uncertainty.

(Ref: Neumann P.G. 91995. Computer-related Risks. New York: ACM Press)

#### **4. Theory of Errors and Error Reduction as a Systems problem**

What is an Error?; Error versus adverse outcome or serious outcome.

Accounting for errors due to presence of stochastic input, parametric, and/or output measurement noise signals; Types of faults by nature, duration or extent, permanent faults, transient faults, intermittent faults, localized faults, global faults; Hardware faults, The single-stuck-at model, The bridging model, The stuck-open model; Hardware design and specification faults; Software faults, Software specification faults, Coding faults, Logical errors within calculations, Stack overflows or underflows, Use of un-initialized variables; Microprocessor design faults, faults due to inadequacy of electromagnetic compatibility.

Human errors; Error classification according to internal causative process, input error or misconception, intention error or mistake, execution error or slip; Error classification as per assumed locus of the causal process, endogenous error, exogenous error; error classification by observable nature of error, error of omission, error of insertion, error of repetition, error of substitution.

Design errors; Development errors; Deployment(Testing) errors; Data errors; Detection (Audit) errors.

What is the solution?; Preventive analysis, Failure mode analysis; Towards a systems approach, Physical ergonomics, Individual behavior, Team and group behavior, Organization and management, Legal and societal pressures; Errors and constraints; Decisions, outcomes and error management.

#### **5. Analytical Framework for Defining and Achieving Information Integrity**

Growing Importance of Information; Demand for Information and Information Technology; Efficient and Economic Processing of Information – The significance; Nature of Cost-Effective Information System, Core IS Model viewed as a Costly- not Costless – Decision Process with Objective.

Criticality of Information Integrity for Competitive Advantage; Integrity – Existing Perceptions; Information Integrity: Analysis of Existing Perceptions- Integrity and Security are different, Inadequacy of assumption of Trusted Computing Base and Procedures, Inadequacy of Quality paradigm; Information Integrity- Existing perceptions: The main limitation of- Existing security and auditing models not suitable for I\*I study, Inadequacy of Expected Utility Theory Model.

A Structure for Integrity objective based on Usefulness-Usability-Integrity paradigm, Determinants of Information Value; Cost Benefit Analysis of Information Integrity, Example; Determinants of Information Integrity, IS pre-requisites for identifying the determinants of Information Integrity; Reorganizing Systems Concepts; Continuous

Individual Decision process View of IS: Modeling implication for IS for achieving Usefulness factor in a complex and changing environment; Usability factor and System Controllability — An Analogical Equivalence; Quantifying Usability factor — Example; Determinants of Information Integrity- Accuracy, consistency, Reliability; Cost-benefit analysis of Information Integrity.

Information Integrity Taxonomic Tree, Reliability attribute in response to Information noise, Reliability attribute in response to Information Distortion and System Observability- An Analogical Equivalence, Consistency attribute of Information Integrity; Accuracy attribute of Information Integrity with introduction to Adaptive Learning.

Defining Information Processing Situation- An Axiomatic Statement, Individual Information Processing Situation Cost Components, Cost of Originating Information “T”:  $COST_{OI}(I)$ , Cost of Analyzing Integrity of Information “T”:  $COST_{ANALY}[I*I(I)]$ , Opportunity Cost of Analyzing I\*I for Information “T”:  $COST_{OPPRT}[I*I(I)]$ .

Generalized Equations for Value of Information, and Information Integrity; Information Integrity Attribute Quantifiers, Accuracy, Consistency, Reliability, Integrity Profile; Value of Information, Change in value of Information Integrity due to additional information.

## **6. Software Practices, Standards and Guidelines – review of Current practices**

Current understanding of quality in software, What is quality if not ever escaping?, Software process craft or science, Time-Accuracy trade off; Software failures-Cause and effect, Advantages and disadvantages of Programmable systems, Software-related failures- Fault, Error, Failure, Cause of Faults, Hazardous applications, Quantifying Software Reliability; Effect of Software Life-cycle on Quality, Achieving quality software, Quality control and quality assurance.

## **7. Systems Standards and Guidelines**

Need for standards; Current software approach viewing IS as a closed system; current quality standards, UK Defence Standard 05-21, British Standard 5750, NATO Standards-AQAP series, UK Defence Standard 00-16.

Current Standards and Guidelines, HSE Document: Guidance on the use of Programmable Electronic Systems in Safety Related Applications (UK), IEE: Guidelines for the Documentation of Software in Industrial computer systems (UK), EEA: Guide to the Quality Assurance of Software (UK), EEA: Establishing a Quality Assurance Function for Software (UK), EEA: Software Configuration management (UK), EEA: A Guide to the Successful Start-Up of a Software Project (UK), Ministry of Defence MASCOT (UK), Ministry of Defence JSP 188: Requirements for the Documentation of Software in Military Operational Real-Time Computer Systems (UK), IEEE: Software engineering standards (USA), ElektronikCentralen: Standards and Regulations for Software approval and Certification (Denmark), Guidelines for the Norlik Factory Inspectorates, TUV handbook: Microcomputer in der Sicherheitstechnik (Germany),

EWICS TC7 documents, CEC collaborative project, US Department of defence Standard 2167: Defence System for Software Development, IECCA: Guide to the Management of Software-Based Systems for Defence, 3rd Edition, EQD Guide for Software Quality assurance (MOD Procurement Executive, 1977), JPL Publication 78-53: Standard Practices for the Implementation of Computer Software (NASA) [giving a description of software management functions], MIL-STD-1679: Weapon Systems Software Development [outlining the minimum requirements for software development], MIL-S-52779A: Software Quality Assurance Program requirements, ESA: Software Engineering Standard- A European Space Agency document which describes the full software development life-cycle, British standard 4058- data processing Flow chart Symbols, Rules and conventions, British standard 5476- Specification for Program Network charts, British standard 5887- Code of Practice for Testing of Computer Based Systems, British Standard 3527- Glossary of Terms used in Data processing, British standard 5515- code of Practice for the Documentation of Computer Based Systems, UK Defence Standard 05-67: Guide to Quality assurance in design (one section deals with software quality), Guidance document of Institution of Gas Engineers giving guidance on the safe use of PESS in the gas industry.

In the wake of open system view of IS impacted by system environmental factors of 5”C”s, however, IS is a continuous information originating and processing situation characterized by uncertainty. This calls for viewing databases constituting this IS with their respective data acquisition and information utilization cycles, rendering them to be Information Base management Systems or databases under open system governing the core IS which transforms data into information and in the process is continuously impacted by the 5”C”s. This calls for viewing standards mentioned above within the total IS function. This requires understanding of areas of: Informational and Physical Work Systems; Defining functional work activity, that is, defining Information Goal and Operable Goals; Developing Performance Criterion; Developing Performance Evidences, Identification of Context or Specificity factors characterizing individual information processing situation governing functional work activity; WM&A Instruction Standard; Performance Evidences as a mechanism for performer accountability and continuous innovation for product customization.

Certification based on assessment of performance evidences based on performance criterion.

## **8. Software Integrity Engineering – Systems approach to developing Information Integrity Technology**

(Ref: (i) MoD (1995a) Draft Interim Defense Standard 00-56 Issue 2 *Safety Management Requirements for Defense Systems Containing Programmable Electronics, Part 1: requirements*. Glasgow: Directorate of Standardization; (ii) MoD (1995b) Draft Interim Defense Standard 00-58 *A Guide for HAZOP Studies on Systems Which Include a Programmable Electronic System*. Glasgow: Directorate of Standardization);

## **9. Analytical Framework for Defining Information Integrity**

- a. Cost Benefit Analysis of Information Integrity

**10. Information Integrity Determinants for:**

- a. Content, Process, System;
- b. Information Development System Life Cycle (*IDS*LC) Model Phases:  
Origination, Storage, Retrieval, Validation, Manipulation, Communication and Distribution, *Use*, Discard or Storage for Future *Use*; Information Origination, Storage, Retrieval, Validation, Manipulation, *Use*, Distribution & Communication, Discard or Storage for further *use*.
- c. *IDS*LC Model Activities:
  - i. Information observation
  - ii. Verification
  - iii. Prediction of future states
  - iv. Recompiled responses and abstract reasoning
  - v. Information decision planning, scheduling and implementation
  - vi. Reevaluation, and
  - vii. Resource Management
- d. *IDS*LC Model phases:
  - i. Design
  - ii. Development
  - iii. Testing
  - iv. Commissioning
  - v. Implementation
  - vi. Maintenance
- e. IS systems and components:
  - i. Hardware (Objects)
  - ii. Software
  - iii. People
  - iv. Communication
  - v. Rules
  - vi. Norms
  - vii. Policies

**11. Elective course in Bio-informatics:**

**Preamble:**

Knowledge of the broad landscape of the nearly 3 billion bases of the euchromatic portion of the human chromosomes is transforming biology in 21st century from a purely laboratory based science to an information science as well. The information includes comprehensive global views of DNA Sequence, RNA expression, protein interactions or molecular conformations. Increasingly, biological studies begin with the study of huge databases to formulate specific hypotheses or design large-scale experiments. In turn, laboratory work ends with the accumulation of massive collections of data that must be sifted. These changes represent a dramatic shift in the biological sciences.

One of the crucial steps in this transformation will be training a new generation of biologists who are both computational scientists and laboratory scientists. This major challenge requires both vision and hard work. Vision to set an appropriate agenda for the computational biologists of the future and hard work to develop curriculum and textbook.

**Curriculum:**

Bio-informatics and the Internet; NCBI Data Model; Gene-bank Sequence Database; Submitting DNA Sequences to the Databases; Structure Databases; Genomic Mapping and Mapping Databases; Information Retrieval from Biological Databases; Sequence Alignment and Database Searching; Creation and analysis of Protein Multiple Sequence Alignments; Prediction Methods using DNA Sequences; Predictive Methods using Proteins Sequences; Expressed sequence TAGS (ESTs); Sequence Assembly and Finishing Methods; Phylogentic Analysis; Comparative Genome Analysis; Large-Scale Genome Analysis; Using PERL to facilitate Biological Analysis; I\*I Implications in Bio-informatics.

**Text Book:**

1. Baxevanis Andreas D. and Onellette B. F., “Bioinformatics – A Practical Guide to the Analysis of Genes and Proteins,” Second Edition, Wiley-Interscience, NY, 2001. (\$69=95).

Note: Solutions to problems available for instructors at [www.wiley.com/bioinformatics](http://www.wiley.com/bioinformatics)

**12. Elective Course in Biometrics****Preamble:**

Biometrics bring in a new dimension to individual identity verification. They allow the process to be automated and unsupervised where applicable while providing levels of accuracy and consistency that simply cannot be guaranteed by traditional methods relying solely on human interaction. However biometric verification is not infallible and its implementation requires an understanding of both the technology and the human interface with the technology, if success is to be achieved. Careful consideration must be given to all aspects of biometric system design including the user interface, the technical architecture, the environment in which it is to be deployed and all the background processes necessary for a particular situation. Only then can we be sure of a successful implementation of the technology.

**Curriculum:**

1. Biometric methodologies: Fingerprints, Hand geometry, Iris scanning, Retina scanning, Facial recognition, Voice verification, Signature verification, Other biometric techniques;
2. Identification, Verification and Templates
3. Implementing Biometrics: Understanding the requirements; Understanding the users; Understanding the environment; Putting the system together; Installation issues; Application Development; Monitoring; Running a biometric pilot scheme

**Text Book:**

1. Ashbourn Julian, “Biometrics – Advanced Identity Verification – The Complete Guide,” Springer, 2000.

**13. Elective Course- Developing Trust: Online Privacy and Security**

Contents:

Understanding Security and Privacy: Why Privacy, Privacy Theory, Policy Enforcement, Online Privacy Concepts, Threats to Privacy

The Problem: Design Principles, Development Environment, Case-studies

The Cure: Learning about failure; Why opt-out systems cannot protect privacy; Earning Trust, The Business Case for Privacy, Policy, Practice, Maintaining Trust  
Your first Assignment: Functional Requirements, Design, Development, Operation, Next steps

**Text Book:**

1. Curtin Matt, "Developing Trust: Online Privacy and Security," APRESS, 2002 (US \$ 39.95/-)

**14. Elective Course – Testing Web Security**

**Curriculum:**

1. Planning the Testing Effort: Introduction
2. Test Planning:
  - a. Requirements, The Anatomy of a Test Plan, Master Test Plan
3. Test Design
  - a. Network Security: Scoping Approach, Scoping examples, Device Inventory, Network Topology, Validating Network Design, Validating Device Inventory, Varying Network Topology, Supplemental Network Security
  - b. System Software Security: Security Specifications, Patching, Hardening, Masking, Services, Directories and files, User Ids and passports, User Groups
  - c. Client Side Application Security: Client identification and Authentication; User Permissions; Testing for illicit navigation; Client side data, Cookies, Hidden Fields, URLs, Local Data Files, Windows Registry

Security Client Transmission: Digital certificates, Encryption Strength, Mixing encrypted and non-encrypted content, avoiding encryption bottlenecks

Mobile application Code: Active X Controls, Java Applets, Client-Side Scripts, Detecting Trojan Horse Mobile Code

Client Security: Firewalls, Browser Security Setting, Client Adaptive Code, client Sniffing

- d. Server Side Application Security: Common Gateway Interface (CGI), Language options, Input Data, Permissions and Directories, Scalability; Third Party CGI Scripts, Server Side Includes (SSIs), Dynamic Code (Viewing the Template, Single Point of Failure, System Commands, Demonstration Scripts, Helpful Error Messages), Application code (Compileable Source Code, Noncompileable Source Code, Copyrights, Helpful error Messages, Old Versions), Input Data (Invalid Data Types, Invalid Ranges, Buffer Overflows, Escape Character), Server-Side Data (Data Filenames, Data Trip Wires, Data Vaults, WORMS, Data Encryption, Data deception, Data Islands, Distributed Copies, Fragmented Data, DBMS Enforced Constraints, Filtered Indexes), Application-Level Intruder Detection
- e. Sneak Attacks: Guarding against the Less-Thought-of Security Threats: *Combating Social Engineer*, Tricks by Telephone, Tricks by E-mail, Tricks by Traditional Mail, Tricks by Person; *Twisting Dumpster Driver*, Proper

disposal of paper, Clearing up Brainstorms, Proper disposal of electronic hardware; *Defending against inside Accomplices*, Preventive Measures and Deterrents, Detective Measures, Corrective and Protective Measures; *Preventive Physical Attacks*, Securing a facility, Securing Hardware, Securing software, Securing Data; *Planning against Mother Nature*; *Guardian against sabotage*

- f. Intruder Confusion, detection, and Response: *Intruder Confusion*, Dynamic Defenses, Deceptive Defenses, Honey Pots, Evaluating Intruder confusion; *Intrusion Detection*, Intrusion Detection Systems (IDS), Audit trail, Tripwires and Checksums, Malware, Monitoring; *Intrusion response*, Confirmation of Intrusion, Damage Containment, Damage Assessment and Forensics, Damage Control and Recovery, System Salvage and Restoration, Notification, retaliation and prosecution, Policy review
4. Test Implementation:
    - a. Assessment and Penetration Options: *Staffing Options*, Do It Yourself (DIY), Outsourcing, Combination of In-house and Outsourced Testing; *Tools for testing*, Manual Approach, Automated Approach, Tool Evaluation;
    - b. Risk analysis: *Recycling*, Asset Audit, Fault trees and Attack Trees, Gap Analysis; *Test Priority*, Device Inventory, Threats, Business Impact, Risk Likelihood, Calculating Relative Criticality, Identify and Assign candidate Tests, Priority Modifier, Test Schedule, Failure Mode, Effects and Criticality Analysis (FMECA)
  5. Appendices:
    - a. Appendix A: Overview of Network Protocols, Addresses, and Devices
      - i. Network Protocols: Application Layer, Presentation Layer, Session Layer, Transport Layer, Network Layer, Data Link Layer, Physical Layer, Security-minded Network protocol
      - ii. Network Addresses: Dynamic IP Addresses, Private IP Addresses, Multiple IP Addresses, IP-less Devices, Misdirecting Host names
      - iii. Network Devices: Repeater, Hub, Bridge, Gateway, Switch (Switching Hub), Router, Brouter, Network Controller, Load Balancer, Servers
      - iv. Firewalls: Firewall types, Firewall Configurations
    - b. Appendix B: SANS Institute Top 20 Critical Internet security Vulnerabilities
    - c. Appendix C: Test – Deliverables Template

**Text Book:** Splaine Stepen, “Testing Web Security – Assessing the Security of web sites and Applications”, Wiley 2002

Visit site: [www.wiley.com/compbooks](http://www.wiley.com/compbooks); [www.sqe.com](http://www.sqe.com)

## 15. Elective Course – Impossible Data Ware-house Situations

Curriculum:

*Impossible Management situations*: Management Issues, Changing Requirements and Objectives, Justification and Budget, Organization and Staffing, User Issues, Team Issues, Project Planning and Scheduling

*Impossible Technical situations*: Data Warehouse standards, Tools and Vendors, Security, Data Quality, Integration, Data Warehouse Architecture, Performance

**Text book:** Sid Adleman, “Impossible Warehouse Situations – Solutions from Experts,” Addison-Wesley Information technology series, Boston, 2003. (USD \$ 44.95/-).

## **16. Elective Course: Securing E-Business Systems – a Guide for managers and Executives**

Curriculum:

*Electronic Business System Security: How is E-Business Security Defined, Importance of E-Business over other IT initiatives, Instead of Playing “Catch-up”, what should an organization be doing to design E-Business systems that are secure in the first place?, E-Business Systems and Infrastructure Support Issues: E-Business Defined, A short History of E-Business Innovations, The Need for Secure E-Business Systems, Software: The Vulnerable Underbelly of Computing, The Interoperability Challenge and E-Business success, E-Business Security- An exercise in Trade-Offs, Few Systems Are Designed to be secure,*

*Security Weaknesses in E-Business Infrastructure and “Best Practices” Security: Introduction; Fundamental Technical Security treats; The Guiding Principle of Protection; “Best Practice” Prevention, Detection, and Countermeasures and Recovery Techniques;*

*Managing E-Business systems and Security*

*A “Just-in-Time” Strategy for Securing the E-Business systems: The Role for security Monitoring and Incident Response*

*Designing and Delivering secured E-Business Application Systems*

*Justifying E-Business security and the Security Management Program*

*Computers, Software Security, and Issues of Liability*

*The National Critical Infrastructure Protection (CIP) Initiative*

**Text Book:** Timothy Braith Waite, “Securing E-Business Systems – A Guide for managers and Executives,” John Wiley & Sons, Inc. (USD \$ 39.95/-)

## **17. Advanced Level Course: System Development Control Methods**

**Text Book:** FitzGerald Jerry, “ Designing Controls Into Computerized Systems”, Published by Jerry FitzGerald and Associates, 506 Barkentine Lane, Redwood City, CA 94065, 1981.

## **18. Advanced Level Course: Quality Information Systems**

**Text Book:** Fatemeh (Mariam) Zahedi, “Quality Information System”, boyed and fraser publishing company, Massachusetts, 1995

## **19. Advanced Level Course: Reliability of Computer and Control Systems**

**Text Book:** Viswanadham N., Sarma V.V.S. and M.G.Singh, “Reliability of Computer and Control Systems”, Noth-Holland, Amsterdam, 1991

## **20. Advanced Level Course: Safety Critical Computer Systems**

**Text Book:** Storey Neil, “Safety Critical Computer Systems,” Addison Wesley Longman 1996

## **21. Selected Topics**

- a. Difference between traditional information system and quality information system

## **22. Advanced Level Course: Enterprise Knowledge Management – The Information Integrity Approach**

**Text Book:** Loshin David, “Enterprise Knowledge Management”, Morgan Kaufmann, Academic Press, NY, 2001 (USD 49/-)

## **23. Advanced Level Course: Issues in software Engineering**

**Text Book:** Robert L. Glass, “Facts and Fallacies of Software Engineering”, Addison-Wesley, Boston, 2003

To be continued.....

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### **List of Books referred during 10-14 November 2002 and 17 October – 26 November 2003**

1. Baxevanis Andreas D. and Onellette B. F., “Bioinformatics – A Practical Guide to the Analysis of Genes and Proteins,” Second Edition, Wiley-Interscience, NY, 2001. (\$69=95).
2. Gigerenzer Gerd, “Adaptive Thinking – Rationality in the Real World,” Oxford Press, NY, 2000. (\$45=00).
3. Stein Paul S. G., Grillner Sten, Selverston Allen I, and Stuart Douglas G., “Neurons, Networks, and Motor Behavior,” A Brad Ford Book, MIT Press, Cambridge, Massachusetts, USA, 1997. (\$37=95).
4. Reuven Dukas (Editor), “Cognitive Ecology – The Evolutionary Ecology of Information Processing and Decision Making,” The University of Chicago Press, Chicago, 1998.
5. Simon H. A. (1979), “Information Processing Models of Cognition,” Annual Review of Psychology, 30, 363-396.
6. Simon H. A. (1982), “Models of Bounded Rationality,” Cambridge, MA: MIT PRESS.
7. Haugeland John (Edited by), “Mind Design II – Philosophy, Psychology, Artificial Intelligence (revised and enlarged),” A Bradford Book, Massachusetts, 1997. (\$32=50).
8. Juarrero Alicia, “Dynamics in Action – Intentional Behavior as a Complex system,” MIT Press, 1999.
9. Fodor Jerry, “The Mind Doesn’t Work That Way,” MIT Press, 2000.
10. Sharon Allen, “Data Modeling for Everyone,” Curling Stone Publishing Ltd., 2002. (\$49=99).
11. Young Brian, “Digital Signal Integrity – Modeling and Simulation with Interconnects and Packages,” Prentice Hall Modern Semi conductor Design Series, NJ, 2001.
12. Matt Curtin, “Developing Trust: Online Privacy and Security,” APRESS, 2002. (\$39=95).
13. Ashbourn Julian, “Biometrics – Advanced Identity Verification – The Complete Guide,” Springer, 2000.
14. Teorey Toby J., Database Modelling and Design,” Morgan Kaufmann Publishers, An Imprint of Academic Press, 1990, 1994, 1999, USA.
15. Adleman Sid, “Impossible Datawarehouse Situations – Solutions from the Experts,” Addison Wesley Information technology Series, Boston, 2003. (\$ 44=99).

16. Braith Waite Timothy, "Securing E-Business Systems – A Guide for managers and Executives," John Wiley & Sons, Inc. (\$39=95).
17. Wadsworth Harrison M., Stephens Kenneth S., Godfrey A. Blanton, "Modern Methods for Quality Control and Improvement," Wiley, 2002. (\$86=75). (Note: A Very Rigorous Quality Control Book).
18. Miller Thomas E. and Berger Daryle W., "Totally integrated Enterprises – A Framework and Methodology for Business and Technology Improvement," Raytheon Professional Services, LLC, St. Lucie Press, NY, 2001.
19. Henderson Allen J., "The e-learning – Question and Answer Book – A Survival Guide for Trainers and Business managers," AMACOM, American Management Association, NY, 2003. (\$19=95).
20. O'Leary Daniel E., "Enterprise Resource Planning Systems – Systems, Life Cycle, Electronic Commerce, and Risk," Cambridge University Press, 2000.
21. Harvard Business Review on Knowledge Management, Harvard Business School Press, 1998. (\$19=95).
22. Power Thomas and Jerjan George, "ECOSYSTEM – living the 12 principles of networked business," FT.com, Financial Times, London, 2001.
23. Pascale Richard T., Millemann Mark, and Gioja Linda, "Surfing the Edge of Chaos – The Laws of Nature and the Laws of Business," Three Rivers Press, NY, 2000.
24. Rosenberg Marc J., "e-learning — Building Successful Online Learning in Your Organization — Strategies for Delivering Knowledge in the Digital Age," McGraw Hill, NY, 2001. (\$29=95).
25. Crowe Michael J., "Modern Theories of the Universe — From Herschel to Hubble," Dover Publications, Inc., NY, 1994.
26. Ryan Peter and Schneider Steve, "Modeling and Analysis of Security Protocols," Addison Wesley, London, 2001. (\$39=99).
27. Hornberger Werner and Schneider Jürgen, "Security and Data Protection with SPA Systems," SPA Press, Addison Wesley, London, 2002. (\$49=99).
28. Atreya Mohan, Hammond Benjamin, Paine Stephan, Starrett Paul, and Wu Stephan, "Digital signatures," RSA Press, McGraw-Hill, NY, 2002. (\$59=99).
29. Brenton Chris and Hunt Cameron, "Mastering Network Security," SYBEX, San Francisco, London, 2003.
30. Anderson Ross, "Security Engineering — A Guide to Building Dependable Distributed Systems," Wiley, 2001. (\$65=00).
31. Loshin David, "Enterprise Knowledge Management – The Data Quality Approach," Morgan Kaufmann, An Imprint of Academic Press, NY, 2001. (\$49=00).
32. Dunham Margaret H., "Data Mining- Basic and Advanced Topics,"
33. Zahedi Fatemeh (Mariam), "Quality Information Systems," boyed and fraser publishing company, USA, 1995.
34. Robert L. Glass, "Facts and Fallacies of Software Engineering", Addison-Wesley, Boston, 2003 (\$29=99)
35. James Grier Miller, "Living Systems", University Press of Colorado, Published by McGraw-Hill in 1978, Published by the University of Colorado Press in 1995.
36. "Working for a doctorate – A Guide for Humanities and Social Sciences", Edited by Norman Graves and Ved Varma, Routledge, London & New York, 1997 (LSE Library No.: LB 2371 W92)

37. Wesley A. Magat, Alan J. Krupnick, Winson Harrington, "Rules in the Making – A Statistical Analysis of Regulatory Agency Behavior, Resources for the Future / Washington, D.C., 1986 JF 1525 (LSE Library No.: D4 M18)
38. Kenneth R. Hammond, Editor, "Judgment and Decision in Public Policy Formation," AAAS Selected Symposium Series, Published by Westview Press, 5500 Central Avenue, Boulder, Colorado, 1978 (LSE Library No.: JF 1525.D4. J91)

**Note:** It is worthwhile to find out if the book is available with American Association for the Advancement of Science (AAAS), 1776 Massachusetts Avenue, N.W., Washington, D.C. The book is exclusively distributed by Ernst Ben Limited, Sovereign Way, Tornbridge, England, outside USA and its possessions, Canada and Central and South America.

39. Einhorn Hillel J., "Decision Errors and Fallible Judgment: Implications for Social Policy", In Judgment and Decision in Public Policy Formation, Edited by Kenneth R. Hammond, AAAS Selected Symposia, Published by Westview Press, 5500 Central Avenue, Boulder, Colorado, 1978, pp. 142-169 (LSE Library No.: JF 1525.D4. J91)
40. Kenneth R. Hammond, "Toward Increasing Competence of Thought in Public Policy Formation", In Judgment and Decision in Public Policy Formation, Edited by Kenneth R. Hammond, AAAS Selected Symposia, Published by Westview Press, 5500 Central Avenue, Boulder, Colorado, 1978, pp. 11-32 (LSE Library No.: JF 1525.D4. J91)
41. McKenna Christopher K., "Quantitative Methods for Public Decision Making", McGraw-Hill book Co., 1980.

Chapters:

- i) Introduction: Decision Making and Models
- ii) Basic Probabilistic Concepts
- iii) Probability Distributions
- iv) Decision Theory: A Framework for Decision Making
- v) Decisions and Revised Probabilities
- vi) Utility Theory and Multiple Objectives
- vii) Cost-Benefit Analysis
- viii) Introduction to Linear Programming: Formulation and Graphic Solution
- ix) Linear Programming II- Sensitivity Analysis
- x) Linear Programming III – The Simplex Method
- xi) Goal Programming
- xii) Project Management: A Network Model
- xiii) Queuing
- xiv) Simulation
- xv) Management Information System
42. Lerner Allan W., «The Politics of Decision-Making», Sage Publications, Beverly Hills, London, 1976.

**Note:** "Defining decision-making as a collective, political process based on the interaction of politician and expert. Lerner proceeds to provide an analysis of the dynamics of organized decision-making – i.e., of bureaucratic politics.

43. Skjei Stephan S., "Information for Collective Action – A Micro-analytic View of Plural

Decision-Making”, Lexington Books, D.C. Heath and Company, Massachusetts, Toronto, London, 1973.

**Note 1:** Chapter 2 is on “Information” with following sub-sections:

- Facts and Values
- Types of Information
- The Production of Information
- Control and Planning
- Three Consequences of Planning
- How Much Information

**Note 2:** Author Skjei Stephan S. is from University of Virginia.

44. S. R. Epton, R.L. Payen and A. W. Pearson, “Managing Interdisciplinary Research”, John Wiley & Sons, 1983 (In the Library of University of Bath).
45. Phil Carroll, “How to chart Data”, McGraw-Hill Book Co., Inc., NY, 1960 (In the Library of University of Bath).
46. Donald J. Clough, “Decisions in Public and Private Sectors: Theories, Practices and processes”, Prentice-Hall, Inc, Englewood Cliffs, N.J. 0762, 1984 (In the Library of University of Bath) – An interesting book.
47. Derek Rowntree, “The Manager’s Book of Checklist – a practical guide to improving managerial skills”, Gower, 1989.
48. David Boddy, Albert Boonstra, and Graham Kennedy, “Managing Information Systems”, Financial Times Prentice Hall, NY, 2002.
49. James O. Hicks, Jr, “Management Information Systems – A User Perspective”, West Publishing Co., NY, 1993.

**Note:** West Publishing Co., 610 Opperman Drive, P.O. Box 64526, St. Paul, MN 55164-0526

50. Richard O. Mason and E. Burton Swanson, “Measurement of Management Decision,” Addison-Wesley Series on Decision support, reading, Massachusetts, 1981.
51. George P. Richardson and Alexander L. Pugh III, “Introduction to System dynamics Modeling”, System Dynamics Series, PEGASUS Communications, 1999, Pounds 25.95  
**Note:** This book, which can be a text book, is based on ‘DYNAMO’ method of simulation.
52. Boardman, Greenberg, Vinning, Weimer, “Cost-Benefit Analysis”, Prentice-Hall, New Jersey, 2001, Pounds 41.99 ([www.prenhall.com](http://www.prenhall.com), [www.prenhall.com/boardman](http://www.prenhall.com/boardman)).
53. Mann Charles c., “Homeland Insecurity”, In The Atlantic Monthly in “The Best American Science and Nature 2003” writing, Edited by Richard Dawkins, Series Editor Tim Folger, Houghton Mifflin Co., Boston, NY 2003, pp. 145-169, USD 13.00
54. Harrison M. Wadsworth, Kenneth S. Stephens, A. Blanton Godfrey, “Modern Methods for Quality Control and Improvement”, John Wiley & Sons, 2002, USD 86.75
55. Jack Uldrich with Deb Newberry, “The next big thing is really small – How Nanotechnology will change the future of your business”, Crown Business, NY, 2003, USD 18.95 (Also available as e-book [www.randomhouse.com](http://www.randomhouse.com))
56. Mark Ranter and Daniel Ranter, “Nanotechnology – A Gentle introduction to the Next Big Idea”, Prentice Hall, NJ, [www.phptr.com](http://www.phptr.com), 2003, Pearson Education, Inc, USD 24.99

57. Charles P. Poole Jr., Frank J. Owens, « Introduction to Nanotechnology », Wiley, 2003, USD 79.95
58. Robert L. Glass, “Facts and Falacies of Software Engineering”, Addison-Wesley, NY, Pearson Education Inc, 2003, USD 29.99
59. O’Reilly, “Extreme Programming-Pocket Guide”, Chromatic, 2003 (Online availability at [safari.oreilly.com](http://safari.oreilly.com); For more information: [corporate@oreilly.com](mailto:corporate@oreilly.com) at [safari.oreilly.com](http://safari.oreilly.com); For more information: [corporate@oreilly.com](http://corporate@oreilly.com))
60. Robert C. Camp, “Business Process Benchmarking – Finding and Implementing Best Practices”, ASQ Quality Press, Milwaukee, Wisconsin, 1995, USD 44.00
61. Robert W. Bly, “Secrets of Successful Telephone selling – How to generate more leads, Sales, Repeat Business, and Referrals by Phone”, An Owl Book, Henry Holt and Company, NY, 1997, USD 17.00
62. Peter Bradshaw, Alison Duff, John Dunlop, Alan Jarvis, Graham Redfern and Julia Wright, “Intermediate GNVQ Information and Communication technology Options”, Series Editor: Jenny Lawson, Longman, An imprint of Pearson Education, New York, 2002, [www.pearsonedu.com](http://www.pearsonedu.com), **Note:** For GNVQ Intermediate, also, GNVQ Foundation; each of these books is a resource book for appropriate certification.
63. Hoskar Ian, “Internet Skills for the Workplace – Empowering yourself for the digital age”, [www.internet-handbooks.co.uk](http://www.internet-handbooks.co.uk), Internet handbooks Limited, UK, 2002
64. Wallace Patricia, “The Psychology of the Internet”, Cambridge University Press, 2001
65. Wall Nancy, “The Complete A-Z Economics Handbook”, Hodder and Stoughton, 2001, Printed in Great Britain for Hodder & Stoughton Educational, a division of Hodder Headline Plc, 338 Euston Rd., London NW1 3BH, by the Bath Press Ltd.
66. Paul Bocij, Dave Chaffey, Andrew Greasley, Simon Hickie, “Business Information Systems – Technology Development and Management for the e-business”, Financial Times, Prentice Hall, 2003, Online resources for this book at: [www.booksites.net](http://www.booksites.net), A good text book
67. Steve Hurd and Jean Mangan (Check?), “Essential Data Skills for Business Management,” Statistics for Education, 5, Bridge Street, Bishops Stortford, CM23 2JU, Ph: 01279 652183, <http://www.statistics.gov.uk>, 2001
68. Graham Wilson, “Problem Solving”, Published in association with Price Water House Coopers, The Fast-Track-MBA Series, A-DO-It-Yourself MBA Course, Kogen Page, 2001, (It’s useful to see it it can be a text book).
69. Lynn Brittney, “e-mail and business letter writing”, Foulsham, London, 2000
70. “The Growing Business Handbook”, Consultant editor Adam Jolly, KPMG, Royal & Sunalliance, Kogen Page, 2001, (Putting e-learning in business), [www.knowledgepool.com](http://www.knowledgepool.com)
71. Andrews Bradbury, “Successful Presentation Skills”, Kogen Page, Pentonville Limited, 120 Pentonville Road, London N1 9JN, 2000
72. Kenneth Lysons and Michael Gillingham, “Purchasing and Supply Chain Management”, FT Prentice hall, 2003, (Interesting as Text Book).
73. Fred Tickle and Geoff Vorely, “ Introduction to Quality Assurance”, Quality Management and Training (Publications) ltd., UK; E-mail: [fred@qmt.co.uk](mailto:fred@qmt.co.uk); Web site: <http://www.cableol.co.uk/uk/qmt/index.htm>
74. Joel E. Ross, “Total Quality Management – Text, Cases and Readings”, St. Lucie Press, 100 E. Linton Blvd., Suite 403 B Delray Beach, FL 33483, 1995

75. Michelle Cook & Curtis Cook, “Competitive Intelligent Organization and Compete to Win”, Kogen page US 163 Central Avenue, Suite 2 Dover NH 03820 USA, 2000, (includes benchmarking issues) – Interesting.
76. Nicholas Bahra, “Competitive Knowledge Management”, Palgrave, Houndmills, Basingstoke, Hampshire RG210XS and 175 Fifth Avenue, NY – 100 10, 2001, Interesting Book.
77. Stephen Kaye, “Make Telesales Work”, How To Books, e-mail: [info@howtobooks.co.uk](mailto:info@howtobooks.co.uk), Web site: <http://www.howtobooks.co.uk>, 2001
78. HAAG/CUMMINS/MCCUBBREY, “Management Information Systems for the information Age”, Pounds 36.99, Irwin, McGraw-Hill [www.mhhe.com/haag](http://www.mhhe.com/haag), To order a copy of SimNet MIS, talk to your professor or place a request through your book store (Use ISBN 0072866004)
79. Horton Mike and Mugge Clinton,” HACK Notes – Network Security”, OSBORNE, Pounds 19.99, [www.osborne.com](http://www.osborne.com), The McGraw-Hill Company
80. Cormac Butler, “Mastering Value at Risk (VaR)”, FT Prentice Hall, 1999, [www.financialminds.com](http://www.financialminds.com), Pounds 45.00.
81. John Gray, “False Dawn – The delusions of Global capitalism”, GRANTA Books, 1998, London, Pounds 8.99.

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