Lectures for the course: Information and System Security (IT 60112)

Week 1

Lecture 1 – 02/01/2013

• Introduction to the course
• Evaluation Guidelines
• Term paper and Term project guidelines

Week 2

Lecture 2 – 07/01/2013

• Confidentiality, Integrity and Availability
• Threats and attacks

Lecture 3 – 08/01/2013

• Goals of security
• Policy and mechanism
• Assumptions and trust
• Assurance
• Operational and human issues

Lecture 4 – 09/01/2013

• Protection state of a system
• Access Control Matrix model
• Access control by Boolean expression evaluation
• Copying of rights and surrender of copied rights

Week 3

Lecture 5 – 14/01/2013

• HRU Model
• Components of HRU model
• Example commands
• System configuration and transition under primitive operations

Lecture 6 – 15/01/2013
• HRU Model contd.
• Generating new configurations using commands in HRU
• Example state transition in HRU

Lecture 7 – 16/01/2013

• Leakage of rights and safety in HRU
• Synthesis and analysis or protection systems
• Take grant protection model
• Graph rewriting rules in TGP

Week 4

Lecture 8 – 21/01/2013

• Take Grant Protection model contd.
• Acquiring rights in subject only graphs

Lecture 9 – 22/01/2013

• Acquiring rights in subject-object protection graphs

Lecture 10 – 23/01/2013

• MAC, DAC, RBAC and ABAC
• Confidentiality and Integrity policies
• Bell-LaPadula Model

Week 5

Lecture 11 – 28/01/2013

• Biba’s integrity policies

Lecture 12 – 29/01/2013

• Lipner’s integrity policy

Lecture 13 – 30/01/2013

• Clark and Wilson’s model
• Chinese Wall model

Week 6
Lecture 14 – 05/02/2013

• Class test 1 held

Lecture 15 – 06/02/2013

• Authentication
• Components of an authentication system
• Password
• Dictionary Attack Type 1
• Pronounceable passwords
• System generated and use-selected passwords

Week 7

Lecture 16 – 11/02/2013

• Password ageing
• Challenge-response
• Dictionary attack type 2
• S/Key one time password
• Class test scripts shown and feedback given

Lecture 17 – 12/02/2013

• Kerberos

Lecture 18 – 13/02/2013

• Kerberos realms and multiple kerberi
• Summary of topics covered

Week 8

Mid sem exam held

Week 9

Lecture 19 – 27/02/2013

• Secure system design principles
• Mid sem scripts shown and feedback given

Week 10
Lecture 20 – 04/03/2013

- RBAC - Introduction

Lecture 21 – 05/03/2013

- Role Hierarchy in RBAC
- RBAC0, RBAC1

Lecture 22 – 06/03/2013

- Constraints in RBAC
- RBAC2 and RBAC3

Week 11

Lecture 23 – 11/03/2013

- Administrative RBAC
- Temporal, Spatial and spatio-temporal extensions to RBAC
- TRBAC
- Calendars and Periodic expressions

Lecture 24 – 12/03/2013

- Pi and Sol functions
- Event expressions
- REB
- Runtime requests

Lecture 25 – 13/03/2013

- Blocked and non blocked event expressions
- Role engineering and role mining
- Trivial solutions
- Basic RMP
- NP completeness result
- Delta-approx RMP

Week 12

Lecture 26 – 18/03/2013

- Min-noise RMP
- Database tiling problem and solving RMP using DBT
• Calendars and Periodic expressions

Lecture 27 – 19/03/2013

• Role mining using minimum biclique cover approach
• New directions in role mining research – constrained role mining

Lecture 28 – 20/03/2013

• Introduction to assurance
• Need for assurance
• Assurance vs. control of quality
• Estimation of effort
• Function point, productivity, person month rate
• Pre-proposal phase
• Fixed cost and T&M projects

Week 13

Lecture 29 – 25/03/2013

• Informal, semi-formal and formal approaches to assurance
• Policy, design, implementation and operational assurance
• Peer review
• Defect report, review effectiveness
• UCL and LCL
• Productivity

Lecture 30 – 26/03/2013

• Requirements traceability
• Defect leakage
• Internal audit and external audit
• ISO and SEI CMM
• Certification audit and surveillance audit

Week 14

Lecture 31 – 01/04/2013

• Configuration Management
• Version numbering
• Problem report
• Introduction to formal methods
Lecture 32 – 02/04/2013

- Model checking
- CTL
- Example safety, liveness and non-blocking properties using critical section problem
- TCSEC

Lecture 33 – 03/04/2013

- ITSEC
- CC

Week 15

Lecture 34 – 08/04/2013

- Intrusion detection systems
- NIDS, HIDS and DIDS
- Misuse detection and anomaly detection
- True positive and false positive
- Base rate fallacy

Lecture 35 – 09/04/2013

- Course Summary