

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 of 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 kerberis
- 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