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

Week 1

Lecture 1 – 07/01/2015

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

Lecture 2 – 08/01/2015

• Confidentiality, integrity and availability
• Threats
• Policy and mechanism
• Assumptions and trust

Lecture 3 – 09/01/2015

• Assurance
• Goals of security
• Operational issues
• People issues

Week 2

Lecture 4 – 14/01/2015

• Protection systems
• Access control matrix
• Access control by Boolean expression evaluation

Lecture 5+6 – 16/01/2015

• HRU model
• Protection state transition in HRU model
• Safety in HRU model

Week 3

Lecture 7 – 21/01/2015

• Take grant protection model
• Graph re-writing in TGP
• Sharing of rights in subject-only graph

Lecture 8 – 22/01/2015

• TGP – Subject-object graphs
• Properties of TGP model
• DAC and MAC – definitions
• Confidentiality and integrity policies - definitions

Lecture 9+10 – 23/01/2015

• Bell-LaPadula model
• Biba’s integrity models

Week 4

Lecture 11 – 28/01/2015

• Lipner’s model

Lecture 12 – 29/01/2015

• Clark-Wilson integrity policies
• Introduction to Chinese Wall security policy

Lecture 13 – 30/01/2015

• Chinese Wall security policy
• Practice problems

Week 5

Lecture 14 – 04/02/2015

• Authentication
• Password based authentication
• Countering dictionary attacks

Lecture 15 – 05/02/2015

• Pass algorithm
• Challenge-response
• S/Key One time password
Lecture 16 – 06/02/2015

• Class test 1 held

Week 6

Lecture 17 – 11/02/2015

• Kerberos

Lecture 18 – 12/02/2015

• Kerberos realms and multiple Kerberi
• Secure system design principles

Week 7

• Mid-sem exam held

Week 8

Lecture 19 – 25/02/2015

• Mid-sem scripts shown and feedback given

Lecture 20 – 26/02/2015

• Role based access control
• RBAC0 and RBAC1

Lecture 21 – 27/02/2015

• RBAC2 and RBAC3
• Constraints
• SoD constarints
• SMER constraints

Week 9

Lecture 22 – 04/03/2015

• ARBAC
• Security analysis in RBAC
• Role mining introduction
05/03/2015 class not held due to workshop

**Week 10**

**Lecture 23 – 11/03/2015**

- Formal definitions of role mining problems
- Basic RMP, δ-approx. RMP, Min-noise RMP
- Algorithms for database tiling for solving Basic RMP

**Lecture 24 – 12/03/2015**

- Minimum biclique cover approach for solving RMP

**Lecture 25 – 13/03/2015**

- Temporal RBAC
- New research directions in access control

**Week 11**

**Lecture 26 – 18/03/2015**

- Assurance
- Pre-proposal phase
- Function points and effort estimate
- Fixed cost and T&M projects

**Lecture 27 – 19/03/2015**

- 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 28+29 – 20/03/2015**

- Requirements traceability
- Defect leakage
- Internal audit and external audit
- ISO 9001 and SEI CMM
- Configuration management and operational assurance
- Problem report
• Practice problems

Week 12

Lecture 30 – 25/03/2015
• Practice problems

Lecture 31+32 – 27/03/2015
• Formal techniques for assurance
• CTL
• Demonstration of Alloy as a tool for security analysis

Week 13

Lecture 33 – 01/04/2015
• Evaluating systems
• TCSEC

Week 14

Lecture 34 – 08/04/2015
• ITSEC
• CC

Lecture 35 – 09/04/2015
• Intrusion detection systems
• NIDS, HIDS, DIDS
• Misuse based and anomaly-based intrusion detection

Lecture 36 – 10/04/2015
• Base rate fallacy
• Challenges in designing anomaly-based IDSs

Week 15

Lecture 37 – 15/04/2015
• Course summary