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