COURSE SPECIFICATION

Code: **School: Department of Computer Science**
Course Title: Advanced Topics in Operating Systems
Course Coordinator: Dr. Marenglen Biba
Level: M **Credit: 12**
Department: CS **Pre-requisites:**

Examination Sample

Chap. 1

1. **Describe the aspects of Distribution Transparency. (5 points)**
2. **Describe the three scaling techniques in Distributed Systems? (5 points)**
3. **Describe the properties of a transaction? (5 Points)**
4. **What is a nested transaction and how is it handled? Sketch the schema of a Transaction Processing Monitor. (5 Points)**
5. **Sketch and describe the two schemas for the organization of Sensor Networks. (5 Points)**

Chap. 2

6. **Give an example of a 3-tiered client-server architecture. (5 points)**
7. **Describe vertical and horizontal distribution. (5 points)**
8. **Describe how is a structured P2P network organized. (5 points)**
9. **Describe how a middleware is made adaptive. (5 points)**

Chap. 3

10. **What is a stateless server and what are the consequences of having this server. (5 points)**
11. **Sketch and describe the architecture of a three-tier server cluster. (5 points)**
12. **Describe the three types of bindings process-to-resource. (5 points)**

Chap. 4

13. **Where is the middleware positioned in the reference model and which are the services of a middleware. (5 points)**
14. **Which are the components involved in a RPC. Describe the step-by-step execution of such calls. (5 points)**
15. **Which are the three types of transmitting continuous media. (5 points)**

Chap. 5

16. **What is the difference between iterative and recursive look-up? (5 points)**
17. **What is a hierarchical location service? (5 points)**
18. **How is DNS organized? Describe the structure of DNS. (5 points)**

Chap. 6

19. **Describe the Berkeley algorithm. (5 points)**
20. **Describe the token-based solution. (5 points)**
21. **Describe the permission-based approach with a centralized algorithm. (5 points)**
22. **Describe the bully algorithm. (5 points)**

Chap. 7

23. **Describe the degrees of continuous consistency. (5 points)**
24. **Sketch and describe a server-initiated replica. (5 points)**
25. **What are the pull and push-based protocols. (5 points)**
26. **Sketch and describe the remote-write protocol. (5 points)**

Chap. 8

27. **Which are the failure models? Describe them briefly. (5 points)**
28. **Describe the two models for process resilience. (5 points)**
29. **Describe the Byzantine agreement problem. (5 points)**
30. **Describe a basic Reliable-Multicasting Schema. (5 points)**
31. **Describe coordinated checkpointing. (5 points)**

Chap. 9

32. **What is the difference between symmetric and asymmetric cryptosystems? (5 points)**
33. **Sketch and describe a simple schema of challenge-response protocol based on shared-secret key. (5 points)**
34. **Sketch and describe the schema of Access Control Matrix. (5 points)**

Chap. 11

35. **Sketch and describe the client-server architecture of NFS. (5 points)**
36. **Describe the Google File System. (5 points)**

Chap. 12

37. Describe the CGI architecture. (5 points)

Chap. 13

38. Describe the overall approach of a publish-subscribe system. (5 points)
39. Describe fault-tolerance in TIB/Rendezvous. (5 points)
40. Describe the overall security approach for a publish-subscribe system. (5 points)