**VICTORIA UNIVERSITY OF WELLINGTON**
***Te Whare Wananga o te Upoko o te Ika a Maui***

# *Advanced Database Design and Implementation*

## *Lecturer Dr Pavle Mogin*

*SWEN 432*
*Advanced Database Design and Implementation*

# Welcome

- Welcome to SWEN 432

## Advanced Database Design and Implementation

- Lectures are in EA120:
  - Monday 09:00 to 09:50 am,
  - Wednesday 09:00 to 09:50 am, and
  - Friday 09:00 to 09:50 am.

# People

- *Course Coordinator* : Dr Pavle Mogin
  - CO 230,
  - ph: 463 5352
  - email: pmogin@ecs.vuw.ac.nz
- *Office hours* :
  - Monday 11:00 am to 12:30 pm
  - Otherwise send me an email to make an appointment for everyone's convenience

# Class List

| | | | |
|---|---|---|---|
| Shweta | Cameron D | Erica | Harman |
| Priyanka | Benjamin | Aaron | Christopher |
| Jovan | Raymond | Neel | Songbo |
| Cameron B | Lauren | Ronni | Lei |
| Valerie | Leila | Jennifer | Daniel |
| Nathan | Mansi | Kaszandra | |
| Zoltan | Mansour | Bilal | |

# Class Representative

- Take on a Class Rep role this trimester, be eligible for a Class Rep Scholarship, win prizes and contribute to the student experience at Victoria
- Class Reps are expected to:
  - Liaise with the lecturer on any student concerns,
  - Act as a contact point for classmates,
  - Relay important information from your lecturer/VUWSA to the class, and
  - Attend a VUWSA Class Rep training session.
- An important volunteer role!
- Representing your class can go towards the Victoria Plus Award

# Advanced Database D&I – General

- *Prerequisite* :
  - Either COMP 302, or SWEN304, or
  - A corresponding database course, or
  - A substantial practical experience in using database systems

- *Weekly Workload* :
  - Three lectures
  - Doing a mandatory essay
  - Doing an assignment
  - Reading, making preparations for lectures and assignments
- Expected workload: 10 hours a week at least

# Advanced Database D&I - Goals

- The paper considers:
  - Emerging and promising implementations in database systems and
  - Ways how to implement and maintain robust, secure, available, scalable and reliable database systems
- This year, we consider:
  - Cloud Databases as a field which has achieved a high attention in academia and a wide application in industry during the last few years (70% of the course)
  - Data Warehousing (Business Intelligence) as a well established database implementation in industry (30% of the course)

# Cloud Databases

- Cloud computing and cloud services
- Cloud Databases
  - Motives for the introduction
  - Basic terms and characteristics
  - CAP (**C**onsistency, Availability, **P**artition **T**olerance) Theorem
  - BASE properties
- Partitioning and replication
- Data versioning
- Cloud data models
- Amazon's Dynamo
- Cassandra
- MongoDB

# Data Warehousing

- Decision Support Systems (DSS) and their databases
- OLAP and OLAP queries
- Data Warehouse Structures
  - Star Schema
  - Special Indices
  - Materialized Views
  - Attribute Hierarchies
- Query Accelerating Techniques
  - Query Rewriting
  - SQL:1999 OLAP Statements
- Populating a Data Warehouse
- Data Warehouse Architectures

# The Proposed Reading and Literature

- “Readings” on the course Home Page contains links to all topics that will be discussed in lectures
- Other useful and necessary literature (research and overview articles) you will find on WEB

# Advanced DB D&I - Assessment

| Item | Weight | Requirement |
|---|---|---|
| Essay | 15% | Mandatory |
| Assignments | 25% | At least 40% |
| Final Examination | 60% | At least D |

**Course requirement:**

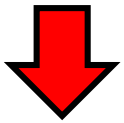
- At least a C- grade for the course

# Student Workload Evaluation and Fails

| Year | Work Load | Fails |
|---|---|---|
| 2009 | 2.4 | 1 / 8 |
| 2010 | 2.9 | 0 / 13 |
| 2011 | 2.5 | 3 / 14 |
| 2012 | 2.8 | 1 / 7 |
| 2013 | 2.9 | 0 / 8 |
| 2014 | 2.9 | 1/11 |
| 2015 | 2.2 | 2/24 |
| 2016 | 2.8 | 0/12 |
| **AVG** | **2.675** | **8/97 ~ 8.2%** |

**Workload:**

- **1 far too much**
- **5 far too little**
- **3 average**



FENG average Work Load was 2.8 for 2015

# Essay

- This year's topic:
  - **"*A Comparison of SQL and NoSQL DBMS*"**
  - In lectures, we consider Dynamo (key-value), Cassandra (column family), and MongoDB (document) NoSQL CDBMS
  - An important prerequisite for the course is a familiarity with SQL DBMS
  - In your essay, you need to compare SQL and NoSQL DBMS with regard to:
    - Schemas and flexibility,
    - ACID compliancy
    - Scalability,
    - Availability,
    - Throughput,
    - Security, and
    - Typical applications.
- Due date: 26 May