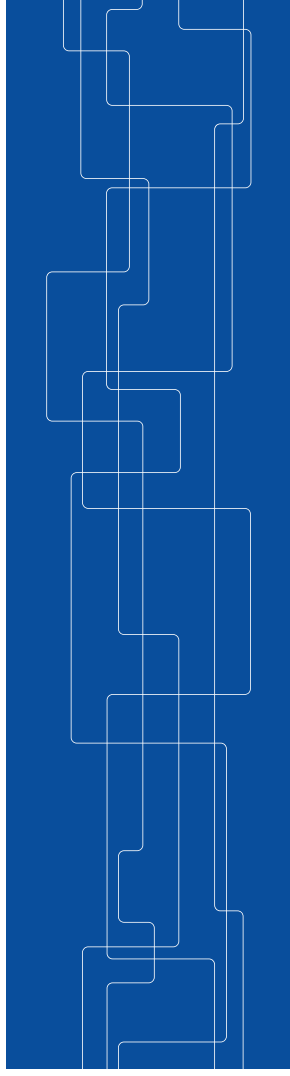




# Course overview

Vladimir Vlassov and Johan Montelius



## Registration

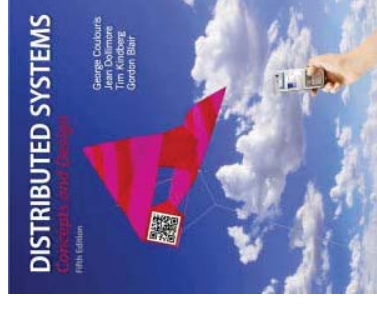
- Register by signing your name on the list, this or next week.
- *If your name is not on the list*, one of the following is true
  - you have not done course selection;
  - you have not done registration for the semester (terminsregistrering);
  - they have not registered you for the the program (programregistrering);
  - something else.
- *If your name is not on the list*, you can add your name and your KTH email address to the list in order to be registered later
  - You will be registered only if you fix ASAP the above that applies to you.

## Course goal

- explain important characteristics of distributed systems
- describe architectural and fundamental models of distributed systems
- explain and compare strategies for inter-process communication
- explain and compare middleware models
- explain and compare name services
- explain the concept of logical time
- use logical time to implement distributed algorithms

## Literature

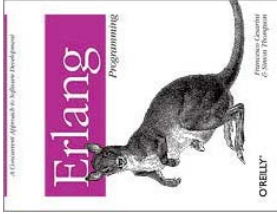
- “**Distributed Computing – Concepts and Design**”, 5<sup>th</sup> edition (4<sup>th</sup> ok)
- Coulouris et al,
- Addison Wesley ([www.cdk5.net](http://www.cdk5.net))



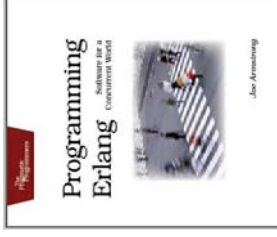


## Erlang

- “**Erlang Programming**”,
- Francesco Cesarini and Simon Thompson
- O'Reilly



- “**Programming Erlang**”
- Joe Armstrong
- Pragmatic Programmer



## Lectures

Fourteen lectures that will mostly follow the course book.  
Do read in advance!

Erlang is only given one lecture, you're expected to pick up a new language on your own.

Slides will be available on the web.



## Lectures

**1: Introduction** - what is a distributed systems and why is it different [Chapters 1 and 2]

**2: Erlang** - concurrent and distributed programming in Erlang.

**3: Networks and process communication** - things you might (or should) know but we'll go through them again [Chapters 3 and 4]



## Lectures

**4: Remote invocation** - language constructs to program distributed systems [Chapter 5]

**5: Indirect Communication** - group communication, publish/subscribe and message queue systems [Chapter 6]

**6: File systems and Name services** - the problems of a distributed file system, performance, consistency [Chapters 12 and 13]



## Lectures

**7: Time** - a simple thing that turns out to be very complex [Chapter 14.1-4]

**8: Global state** - can we describe the state of a distributed system and what can we determine [Chapter 14.5]

**9: Coordination and agreement** - how do we agree and how do we know that we do agree? [Chapter 15]



## Lectures

**10: Transactions** - how can we make a set of operations behave as an atomic operation? [Chapter 16]

**11: Distributed transactions** - now how do we solve it if we have multiple servers [Chapter 17]

**12: Replication** - building fault tolerant systems [Chapter 18]



## Lectures

**13: Distributed Hash Tables** - why do hashing? [Chapter 10]

**14: Summary** ... and the price of olive oil



## Homework and Seminars

You are to perform **5 homework (HW)** to be presented, demonstrated, discussed, and examined at **5 corresponding seminars**

First seminar- help with completing the tasks. Not compulsory.

Following HW and seminars:

- submit your **homework (code and written report)** in a zip file to **Bilda** before a seminar
- hand in **written report** on how you solved the problem
- be prepared to **present and demonstrate your solution**
- connect the systems and do some experiments

Select which group to join in Daisy.



## Homework and Seminars

- **Erlang** – no HW, only helping seminar, not compulsory
- **Rudy** - a small web server
- **Routy** - message routing
- **Loggy** - logic time logger
- **Groupy** - group communication
- **Chordy** - a distributed hash table



## Examination

- **Approved five (5) programming assignments (HW) presented at seminars**
  - Complete tasks and submit to Bilda
  - Present and demonstrate at a seminar (report + code)
- **Written examination**, closed book, of three parts I, II, III
  - I : declarative (multiple choice questions, 24p)
  - II : compare, describe (8 questions, short answers, 16p)
  - III : analytic, reflect (3 questions, essay answers, 12p)



## Grading

- The **first part** of the exam will, scoring 16 or higher, give you an **E**.
- Given a good result on the first part (approx. 20 points) the **second part** will give you a **D or C**.
- Given a good result on the first and second part (approx. 22 and 12 points) the **third part** will give you a **B or an A**.
- Final grade is based on written exam, written reports, presentation and demonstration of homework in seminar sessions.