

# Operating Systems - Video course

## COURSE OUTLINE

The course will provide an introduction to Operating Systems (OS), their design and implementation. We will discuss the goals of an OS, and some successful and not-so-successful OS designs. We will also discuss the following OS services in detail: thread scheduling, security, virtual memory, file system. We will understand the OS concepts practically by directly studying the source code of a small but realistic OS.

## COURSE DETAIL

Lecture 1	Introduction to OS Abstractions (60 mins)
Lecture 2	System Calls and Threads (100 mins)
Lecture 3	x86 Processor Basics (200 mins)
Lecture 4	Address Translation (Virtual Memory) (150 mins)
Lecture 5	Processes and Memory Allocation (200 mins)
Lecture 6	Process Creation (60 mins)
Lecture 7	Modes, Stacks and Traps (100 mins)
Lecture 8	Context Switching (60 mins)
Lecture 9	Multiprocessors and Locking (100 mins)
Lecture 10	Abstracting Synchronization (250 mins)
Lecture 11	Virtual Memory Swapping (150 mins)
Lecture 12	Files and Disk I/O (200 mins)
Lecture 13	Journaling Filesystem (Linux ext3) (120 mins)
Lecture 14	Rethink the Sync (120 mins)
Lecture 15	Read Copy Update (100 mins)
Lecture 16	Scheduling Policies (120 mins)
Lecture 17	Security and Access Control (120 mins)
Lecture 18	Advanced Topics (200 mins)



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## Computer Science and Engineering

### Additional Reading:

- *A Guide to Programming Intel IA32 PC Architecture* by Kai Li: available at <http://www.cse.iitd.ernet.in/~sbansal/nptel2014/ref/>
- Intel Reference Manuals: available at <http://www.cse.iitd.ernet.in/~sbansal/nptel2014/ref/>

### Hyperlinks:

<http://www.cse.iitd.ernet.in/~sbansal/nptel2014/>

### Coordinators:

**Prof. Sorav Bansal**  
Professor Department of Computer Science Engineering IIT Delhi

**References:**

**Primary course reference:** *xv6: a teaching operating system*, by Cox, Kaashoek, and Morris.

Book (draft): <http://www.cse.iitd.ernet.in/~sbansal/nptel2014/book-rev7.pdf> Source code archive: <http://www.cse.iitd.ernet.in/~sbansal/nptel2014/xv6-rev7.src.tbz2> Source listing with line numbers: <http://www.cse.iitd.ernet.in/~sbansal/nptel2014/xv6-rev7.pdf>

MIT's xv6 homepage: <http://pdos.csail.mit.edu/6.828/2012/xv6.html>

**Secondary course reference (optional):** *Operating System Concepts (Eighth Edition)* by Silberschatz, Galvin, and Gagne. John Wiley & Sons, Inc., 2008. ISBN 0-470-12872-0.