

# Subjects common to all tracks

## Mathematics

- [Calculus in one and two variables](#)  
[Chapters 1-6, 10-11, 13]
- [Linear algebra](#)
- Affine geometry in 2D and 3D

## Programming

- Programming Principles and Practice using C++  
B. Stroustrup  
Addison-Wesley Professional, 2008  
[Part I, II, III and Chapter 22]
- [Introduction to C++](#)  
[optional, covers only a subset]

## Operating systems

File system, ability to use a unix shell

- [Operating Systems: Three Easy Pieces](#)  
[Chapters 39, 40]
- [The Linux Command Line](#)  
William Shotts  
[Part I – suggested to become familiar with Linux command line]

## Distributed systems

- The art of concurrency  
Clay Breshears  
O'Reilly Media, Inc., 2009  
[Chapter 1-5 (required), Chapter 6-11 (optional, can be read independently)]
- [Concurrent Java tutorial](#)  
[optional]

## Database management systems

Either of:

- Database Management Systems  
Raghu Ramakrishnan and Johannes Gehrke  
McGraw Hill Higher Education, 2003, Third Edition.

ISBN: 0-07-246563-8

[Chapters 1, 2, 3, 4, 5, 8, 12, 16,19]

- [Minicourses@Stanford](mailto:Minicourses@Stanford)

# Tracks-specific subjects

## Business Intelligence

### Software engineering

Basics of Software Engineering, UML, OO and Java.

- Object-Oriented Software Engineering: Practical Software Development Using UML and Java (2nd edition)  
Timothy Lethbridge and Robert Laganier  
[Chapters 2, 5, 8 + Appendix A]

### Web programming

Concepts related to client-side web programming. Specific technologies: HTML5, CSS, Javascript.

- Learning PHP, MySQL, JavaScript, and CSS, A Step-by-Step Guide to Creating Dynamic Websites.  
R.Nixon  
O'Reilly, 2012
- Learn HTML, Learn CSS, Introduction to Javascript on codecademy

# Pervasive Computing

## Security

Knowledge of programming, operating-systems and networking.

Programming

Fluency in C programming; in particular, familiarity with pointers.

- [A tutorial on pointers and arrays in C](#)
- [The C Programming Language](#)  
Kernighan and Ritchie

## Operating systems

- [Operating Systems: Three Easy Pieces](#)  
[Chapters 2, 4, 5, 6, 7, 8 e 9, 13, 14, 15, 16, 17 , 18, 20, 21, 22, 26, 27 (no 27.4), 28, 32, 36, 37, 39, 40 and 42]

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Timothy Lethbridge and Robert Laganriere  
[Chapters 1, 2, 3, 4, 5, 6, 8, 9, 10, 11 (only 11.1 and 11.2) + Appendix A]

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R.Nixon  
O'Reilly, 2012
- Learn HTML, Learn CSS, Introduction to Javascript on [codecademy](#)

## Networking

This book describes the Internet communication protocols, starting from the Application layer and going down to the Physical layer

- Computer Networking, a Top-Down Approach (6th edition),  
James F. Kurose, Keith W. Ross,  
Addison-Wesley, 2013

[Chapter 1: Sec 1.1, 1.2 (omitting part on physical media), 1.3, 1.5, 1.7 (history of internet), Chapter 2 (Application layer): read Sec 2.1, 2.2, 2.5, Chapter 3 (Transport layer), Chapter 4 (Network layer)]

## Health and Life Sciences

### Mathematics

- [Calculus in one and two variables](#)  
[Chapters 1-6, 9-11, 13]
- [Linear algebra](#)
- Affine geometry in 2D and 3D

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## Visual Computing

### Mathematics

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[Chapters 1-6, 9-11, 13]
- [Linear algebra](#)
- Affine geometry in 2D and 3D

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R.Nixon  
O'Reilly, 2012
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