

# Analytics in Systems Engineering

## ENGR 571 Simplified Syllabus

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### Week/Lecture Content

Week	Lecture Content
1	Statistics for Analytics
2	Machine Learning for Analytics
3	Artificial Intelligence for Analytics
4	Prototyping software for getting to know your data: R, Python, Arduino
5	Data Mining, Knowledge Discovery and PROJECT 1 assigned
6	Parallelism by Task, Component and Meta-Algorithmics
7	1 <sup>st</sup> and 2 <sup>nd</sup> Order Meta-Algorithmics
8	3 <sup>rd</sup> Order Meta-Algorithmics and the Future of Patterns for Intelligent Systems
9	Review, MIDTERM and PROJECT 1 presentations, PROJECT 1 due
10	Systems Engineering and Meta-Algorithmics
11	Applications and PROJECT 2 assigned
12	Applications
13	Meta-Analytics Overview and PROJECT 2 assigned
14	Ground Truth and Optimized System Design for Data Analytics
15	Meta-Analytics Approaches (Survey)
16	PROJECT 2 due, PROJECT 2 presentations, Review, FINAL EXAM

### Textbook and Course Materials:

**Meta-Algorithmics: Patterns for Robust, Low-Cost, High-Quality Systems** (Wiley, 2013), SJ Simske, 384 pp.

#### Additional texts of interest:

1. **Pattern Recognition and Machine Learning** (Springer, 2009, 6<sup>th</sup> printing), CM Bishop, 738 pp.
2. **Deep Learning** (MIT Press, 2013), I Goodfellow, Y Bengio, A Courville, 778 pp.
3. **Data Science for Business** (O'Reilly, 2013), F Provost, T Fawcett, 387 pp.
4. **The Elements of Statistical Learning** (Springer, 2011, 5<sup>th</sup> printing, 2<sup>nd</sup> edition), T Hastie, R Tibshirani, J Friedman, 745 pp.
5. **Foundation of Statistical Natural Language Processing** (MIT Press, 2000, 3<sup>rd</sup> printing), CD Manning, H Schütze, 680 pp.

Additionally, several resource books on Python and R will be available on-line