Program Name: **M.Tech in Computer Science & Engineering**

Specialization: **Information Security**

Aim:
With the ever increasing dependence of information for successful business operations, great emphasis is being laid on protecting business critical information. The scope of Information Security has been undefined and has been used in a customized manner in different contexts. This program aims to provide the basics of the complete end-to-end exposure from systems engineering, operating systems, computer networks and massive data mining, which will help the students to protect organization's business critical information from unauthorized external access.

Program Content:
The content will be spread over a period of 3 years consisting of 6 semesters. The details of the individual semesters are given in the following sections.

	Semester I	**Semester II**
Year 1	Course #1: *Logic and Combinatorics in Computer Science (CS 6030)* Course #2: *Cryptography Basics (CS 6510)*	Course #1: *Advanced Data Structures and Algorithms with Lab (CS 5800 + CS 6140)* Course #2: *Elective #1*
Year 2	Course #1: *Elective #2* Course #2: *Elective #3*	Course #1: *Elective #4* Course #2: *Elective #5* Project #1
Year 3	Project #2	Project #3

The following are the courses that will be offered as Electives (5 courses to be chosen):

A. Information Security and Secure Coding
B. Cloud Computing
C. Mining Massive Data Sets
D. Machine Learning
E. Data Analysis for Research
F. Secure Systems Engineering
G. Computational Number Theory for Cryptography
H. Advanced Computer Organization and Lab
I. Advanced Operating Systems with Lab
J. Advanced Networking with Lab

Existing Courses			New Courses		
Sl No	**Course No**	**Title**	**Sl No**	**Course No**	**Title**
1	CS6030	Logic and Combinatorics in Computer Science	1	CS6510	Cryptography Basics
2	CS5800 + CS6140	Advanced Data Structures and Algorithms with Lab	2	CS6580	Information Security and Secure Coding
3	MS6031 + MS6032	Data Analysis for Research	3	CS6847	Cloud Computing
			4	CS6745	Mining Massive Data Sets
			5	CS5011	Machine Learning
			6	CS6570	Secure Systems Engineering
			7	CS6115	Computational Number Theory for Cryptography
			8	CS6620	Advanced Computer Organization and Lab
			9	CS6550	Advanced Operating Systems with Lab
			10	CS6044	Advanced Networking with Lab

A. **Department of Computer Science and Engineering**

M.Tech. in Computer Science and Engineering (Specialization: Information Security)

	Course No	Course Name	L	T	E	P	O	C
1		Logic and Combinatorics in Computer Science (CS 6030)	3	1	0	0	8	12
2		Cryptography Basics (CS 6510)	3	1	0	0	8	12
	Semester 1	**Total Credits**						**24**
1		Advanced Data Structures and Algorithms (CS 5800 + CS 6140)	3	1	0	6	11	21
2		Elective #1	3	1	0	4	4	12
	Semester 2	**Total Credits**						**33**
1		Elective #2	3	1	0	4	4	12
2		Elective #3	3	1	0	4	4	12
	Semester 3	**Total Credits**						**24**
1		Elective #4	3	1	0	4	4	12
2		Elective #5	3	1	0	4	4	12
3		Project #1	0	0	0	0	20	20
	Semester 4	**Total Credits**						**44**
1		Project #2	0	0	0	0	44	44
	Semester 5	**Total Credits**						**44**
1		Project #3	0	0	0	0	36	36
	Semester 6	**Total Credits**						**36**
		Total Program Credits						**205**

Semester #1

Course Name: Cryptography Basics (3-1-0-0-8)

Course Id: CS 6510

Pre-requisite: CS 6111 or COT

Unit 1:
NUMBER THEORY BASICS: Modular arithmetic, primes, GCD and Chinese reminder theorems
STREAM CIPHERS: Encryption and decryption with Stream ciphers, Shift-register based stream ciphers, DES, AES
BLOCK CIPHERS: ECB, CBC, OFB,CFB, CTR,GCM modes, Double and triple encryptions.

Unit 2:
PUBLIC KEY CRYPTOGRAPHY: RSA, ElGamal, Rabins encryption schemes, Diffe-Hellman Key exchange, practical digital signatures.
ELLIPTIC CURVE CRYPTOLOGY: definitions, group properties and basic algorithms for group operations.

Unit 3:
HASH FUNCTIONS: oneway, collision resistant, preimage resistant HASH functions, Real-world examples.
MESSAGE AUTHENTICATION CODES: MAC from Hash functions, MAC from block ciphers
KEY ESTABLISHMENT PROTOCOLS: Man -in-the-middle Attack, certificates, Public Key Infrastructure and PKI based crypto systems.

Text Books:

1. Christof Paar, Jan Pelzl, Understanding Cryptography, A text book for students and practitioners, Springer Verlag, India, 2010 { INDIAN EDITION}

2. Alfred Menezes. et al, Handbook of Applied Cryptography, CRC Press, USA. { Entire book available for free download in PDF form from authors homepage}
3. William Stallings, “Cryptography and Network Security – 7th Edition”, Pearson, ISBN-10: 0-13-444428-0

Elective #A: Information Security and Secure Coding (3-1-0-4-4)

Course ID: CS 6580

Unit 1 - (8 Hours) Information Security Basics

Introduction to Information Security – Risk Analysis – Legal Issues – Secure Design – Policy, Standards, Procedures and Guidelines – Security Organization structure.

Unit 2 - (16 Hours) Information Security Policy and Compliance

Authentication and Authorization principles - Securing unstructured data – Information Rights Management – Storage security – Data base security.

Unit 3 - (16 Hours) Secure Application

Secure application design – Writing Secure Software – J2EE vulnerabilities.

Unit 4 - (8 Hours) Secure Infrastructure Management

Security Operations Management – Disaster Recovery and Backups – Physical Security.

Text Books

1) *Name:* Information Security – The complete reference
Chapters: 1-9, 11-12, 26-28, 31, 32, and 34
Author: Mark Rhodes - Ousley
Publishers: McGraw Hill 2013
ISBN Number: 978-0-07-178436-8

Practicals (4 hours per week * 12 weeks)

1. Demonstration of attacks after determining vulnerability using hacking tools. Methods to fix such vulnerability to be demonstrated during the practical using the techniques discussed in the book "The CERT C Coding Standard". Tools to be used from https://www.kali.org/ and freely downloadable vulnerability tools.

Outside class (4 hours per week * 12 weeks)

Reference Book:
Name: The CERT C Coding Standard
Chapters: 2 – 14.
Author: Robert C Seacord.
Publishers: Pearson, 2009
ISBN Number: 978-0-321-56321-7

Video Lectures:

1. http://nptel.ac.in/courses/106106129/ - Week 1 – Part 1 to 16.
2. Dr. Daniel Soper lectures https://www.youtube.com/playlist?list=PLIYw7XsK0HV-r0T5fypBv9-a1gbq8xkZR (Parts 1 - 12)

Elective #B: Cloud Computing (3-1-0-4-4)

Course ID: CS 6847

Unit 1 - (9 Hours) (Chapters 1, 2 and 3)

Introduction to cloud – Basic Concepts and Terminology – Concepts and Models of cloud computing – Cloud delivery and deployment models

Unit 2 - (15 Hours) (Chapters 5, 6, 7, 8, 9 and 10)

Cloud enablers and security – Internet, Broadband, Data centre and virtualization technologies, Web and Multitenant services – Cloud security, agent threats – Cloud infrastructure mechanisms – Specialized cloud mechanisms – Cloud Management and Cloud Security.

Unit 3 - (15 Hours) (Chapter 11, 12 and 13)

Basic, Advanced and Specialized Cloud architectures -

Unit 4 - (9 Hours):

AWS, Azure and Google case study

Tutorials to be based on Amazon Web Services usage.

Text Books

1) Name: Cloud Computing : Concepts, Technology and Architecture
Chapters: 1 to 13
Author: Thomas Erl, Zaigham Mahmood and Ricardo Puttini
Publishers: Prentice Hall, 2013
ISBN Number:978-0-13-338752-0

Practicals (4 hours per week * 12 weeks)

1. Use of Dockers in Cloud Computing – the participants have to understand the working of Docker open source and present projects which help in changing the way cloud computing is done.

   Resource available at : https://www.docker.com/

2. Using Amazon Web Services based on the tutorials and Video lectures.

Outside class (4 hours per week * 12 weeks)

Reference Papers:

1. A Vouk, Mladen. "Cloud computing–issues, research and implementations."*CIT. Journal of Computing and Information Technology* 16.4 (2008): 235-246.
2. Agrawal, Divyakant, Sudipto Das, and Amr El Abbadi. "Big data and cloud computing: new wine or just new bottles?." *Proceedings of the VLDB Endowment* 3.1-2 (2010): 1647-1648.
3. Plummer, Daryl C., et al. "Cloud computing: Defining and describing an emerging phenomenon." *Gartner, June* 17 (2008).
4. Armbrust, Michael, et al. "A view of cloud computing." *Communications of the ACM* 53.4 (2010): 50-58.
5. Dikaiakos, Marios D., et al. "Cloud computing: Distributed internet computing for IT and scientific research." *Internet Computing, IEEE* 13.5 (2009): 10-13.

6. Foster, Ian, et al. "Cloud computing and grid computing 360-degree compared."*Grid Computing Environments Workshop, 2008. GCE'08*. Ieee, 2008.
7. Wei, Yi, and M. Brian Blake. "Service-oriented computing and cloud computing: challenges and opportunities." *IEEE Internet Computing* 6 (2010): 72-75.
8. Kumar, Karthik, and Yung-Hsiang Lu. "Cloud computing for mobile users: Can offloading computation save energy?." *Computer* 4 (2010): 51-56.
9. Baliga, Jayant, et al. "Green cloud computing: Balancing energy in processing, storage, and transport." *Proceedings of the IEEE* 99.1 (2011): 149-167.
10. Hwang, Kai, and Deyi Li. "Trusted cloud computing with secure resources and data coloring." *Internet Computing, IEEE* 14.5 (2010): 14-22.
11. Takabi, Hassan, James BD Joshi, and Gail-Joon Ahn. "Security and privacy challenges in cloud computing environments." *IEEE Security & Privacy* 6 (2010): 24-31.
12. Sengupta, Shubhashis, Vikrant Kaulgud, and Vibhu Saujanya Sharma. "Cloud computing security--trends and research directions." *Services (SERVICES), 2011 IEEE World Congress on*. IEEE, 2011.

Video Lectures:

1. http://nptel.ac.in/courses/106106129/21 - Part 4 to Part 11 on cloud computing – part of the course on NOC:Introduction to Information Security
2. Amazon Web Service – Webinar links - https://www.youtube.com/channel/UCT-nPlVzJI-ccQXlxjSvJmw

Elective #C: Mining Massive Data Sets (3-1-0-4-4)

Course ID: CS 6745

Unit 1 - Basics
Introduction to machine learning - Bayesian Decision Theory, MLE; Feature Selection - Information Gain, Derived features: PCA, LDA & PLS, Aggregation/Coding; Handling Missing Values; Class Imbalance: Differential loss functions, differential slack, Sampling based approaches.

Unit 2 – Ensemble Methods
Boosting - Adaboost, LogitBoost, Gradient Boosting; Bagging - Simple methods, Random Forest, Subsampling; Stacking; Decision Fusion.

Unit 3 – Scaling Up
Map-Reduce; Locality Sensitive Hashing; Large Scale optimization; Page Rank on large graphs.

Unit 4 – Clustering
Hierarchical Clustering; k-means; CURE; DBScan; Non-Eucledian spaces; Spectral clustering

Unit 5 – Frequent Pattern Mining
Apriori Algorithm; Large datasets; Limited-pass algorithms; Frequent sub-sequence mining

Unit 6 – Stream Mining
The stream data model, Sampling Data in a stream, Filtering Streams, Bloom Filter, Counting in streams,

Text Books

1. Mining Massive Datasets. Anand Rajaraman, Jeffrey D. Ullman, and Jure Leskovec. Cambridge.

Practicals (4 hours per week * 12 weeks)
Based on Units 1 - 6

Outside class (4 hours per week * 12 weeks)

References:

1. Elements of Statistical Learning. Hastie, Tibshirani, and Friedman. Springer.
2. Pattern Recognition and Machine Learning. Christopher Bishop.
3. Data Mining: Tools and Techniques, 3rd Edition. Jiawei Han and Michelline Kamber.

Video Lectures: Will be announced in the class.

Elective #D: Machine Learning (3-1-0-4-4)

Course ID: CS 5011

Unit 1 – Basics
Introduction to machine learning - different forms of learning; Basics of probability theory, linear algebra and optimization.

Unit 2 – Regression Analysis
Linear regression, ridge regression, Lasso, Bayesian regression, regression with basis functions.

Unit 3 – Classification Methods
Linear Discriminant Analysis, Logistic regression, Perceptrons, Large margin classification, Kernel methods, Support Vector Machines, Classification and Regression Trees, Multi-layer Perceptrons and Back propagation.

Unit 4 - Graphical Models
Bayesian Belief Networks, Markov Random Fields, Exact inference methods, approximate inference methods.

Unit 5 – Ensemble Methods
Boosting - Adaboost, Gradient Boosting; Bagging - Simple methods, Random Forest.

Unit 6 – Computational Learning Theory
PAC Learning, VC Dimension, Bias/Variance Tradeoff.

Unit 7 – Clustering
Partitional Clustering - k-means, k-medoids; Hierarchical Clustering - Agglomerative, Divisive, Distance measures; Density based clustering - DBScan; Spectral clustering

Unit 8 – Frequent Pattern Mining
Apriori Algorithm; FP-Growth

Text Books
1. Elements of Statistical Learning. Hastie, Tibshirani, and Friedman. Springer
2. Pattern Recognition and Machine Learning. Christopher Bishop.
3. Data Mining: Tools and Techniques, 3rd Edition. Jiawei Han and Michelline Kamber.

Practicals (4 hours per week * 12 weeks)
Based on Units 1 – 8.

Outside class (4 hours per week * 12 weeks)
Will be announced during the course.

Video Lectures: Will be given during the course.

Elective #E: Data Analysis for Research (3-1-0-4-4)

Course ID: MS 6031 and 6032 (Existing Courses)

Elective #F: Secure Systems Engineering (3-1-0-4-4)

Course ID: CS 6570

Unit 1 – Hardware Security
Hardware Trojans and Detection – PUFs - Power Analysis Attacks and Countermeasures - Fault Attacks - Implementation Aspects of Crypto Algorithms (A case study of AES and ECC)

Unit 2 – Micro Architectural Security
Timing attacks and Covert Channels - RAM based attacks - Cold boot - Rowhammer

Unit 3 – Operating System Security
Stack Smashing Attacks - Dynamic Memory Allocation Attacks - Format String Vulnerabilities - return-to-libc attacks - ROP attacks - Side Channel Attacks in Operating Systems – Countermeasures - Non-executable stacks - Capability based Systems - Canaries - Malware Analysis Techniques

Unit 4 – Application Security
SQL Insertion - Shell Shock - Heart bleed bug

Unit 5 – Formal Verification of Security Protocols

Text Books

1. Published work in IEEE and ACM will be used for this course.

Practicals (4 hours per week * 12 weeks)

- **Power Analysis Attacks**

Given power traces of an encryption system such as AES, the participants would need to build algorithms to determine the secret key.

- **Fault Attacks**

Given a faulty and a fault free ciphertext, the participants would need to write code to determine the secret key.

- **Timing Attacks**

In this assigment, participants woud develop a timing attack on encryption systems like the RSA or/and AES.

- **Stack Smashing Attacks**

The intent of this assignment is to understand stack smashing and how they can be used to develop malicious software.

- **Operating System Side Channels**

Demonstrate an OS side channel attack. For instance, using memory footprints to determine the web page browsed.

Other potential lab experiments: PUF design, an ECC crypto-system development, format string vulnerabilities.

Outside class (4 hours per week * 12 weeks)

Video Lectures:

1. Cryptography:
https://www.youtube.com/playlist?list=PLvifRcqOOwF9yDamCOXtD5O3fA085X6mP
2. IT Security:
https://www.youtube.com/playlist?list=PLvifRcqOOwF-AWyq03Cgg3NOyklA9CjeR

Elective #G: Computational Number Theory for Cryptography (3-1-0-4-4)

Course ID: CS 6115

Unit 1:
Basics: Integers, Primes, composites, GCD algorithms, CRT, Randomized algorithms, Monte Carlo algorithms, Quadradic residues: Legendre symbol, jacobi symbol, properties and algorithms for quadradic residues.
Primality tests: Eulers test, Rabins test, reliability analysis.

Unit 2:
Abstract algebra for number theory algorithms: Rings, integral domains, finite groups and finite fields.
Discrete logarithms: Baby step- Giant step algorithm, faster sub-exponential algorithms
Factoring algorithms, Rho methods, Sieve methods

Unit 3:
Computations in a finite field.
Algorithms on Elliptic curves.

Text Books:
Victor Shoup, A computational introduction to number theory and algebra,Oxford press, USA { A pdf file of entire book with complete hyperlinks for online reading is available for free download from authors homepage}

Henri Cohen, A course in computational Algebraic Number theory, Springer Verlag, Germany, 1996

Elective #H: Advanced Computer Organization with Lab (3-1-0-4-4)

Course ID: CS 6620

Unit 1: (8 hours)
Basics of Computer Organization – Digital Hardware level, Microarchitecture, Instruction Set Architecture Design, Basic Arithmetic Circuits, Assembly programming.

Unit 2: (10 hours)
Memory Management on x86 and ARM platforms, Segmentation, Paging and Virtual Memory, Multi level memory protection, Cache organization, Microkernel design in Assembly for memory management.

Unit 3: (10 hours)
Hardware for Process Management – Hardware support for - Advanced Scheduling concepts, Inter and Intra Process Protection, Interrupt Service Routines, DMA

Unit 4: (10 hours)
Crypto accelerators, Trusted Platform Module, High Assurance Boot and Tamper detect, Hardware based side-channel attacks.

Unit 5: (10 hours)
Embedded system architecture, Input/Output Subsystem: Peripheral Interfaces like SPI, I2C, PCIe, Block devices.

Text books:

1. C.Hamacher, Z.Vranesic and S.Zaky, "Computer Organization", McGraw-Hill, 2002.
2. W.Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India, 2002.
3. D.A.Patterson and J.L.Hennessy, "Computer Organization and Design - The Hardware/Software Interface", Morgan Kaufmann, 1998.
4. J .P.Hayes, "Computer Architecture and Organization", McGraw-Hill, 1998.

Lab:

Assembly programming demonstrating assembly programming implementing standard high level language constructs, segmentation, task switching, Interrupt service routines, paging. Embedded ARM kit peripheral interfacing.

Reference Videos:

1. NPTEL : http://nptel.ac.in/video.php?subjectId=106106092
2. CMU: https://www.youtube.com/user/cmu18447/videos

Elective #I: Advanced Operating Systems with Lab (3-1-0-4-4)

Course ID: CS 6550

Unit 1 – OS Concepts Revision (5 Hours) (Text book 1)

Process Management subsystem including scheduling and threads programming, Memory Management, Storage Management, Protection and Security, Distributed Systems Introduction

Unit 2 – OS Utilities and Systems call implementation in Linux kernel (15 Hours) (Text book 2 and 3)

File I/O, Process commands, Access Permissions, File systems commands, Signals, Threads – Introduction and Synchronization, Daemons, Shared vs. Static libraries, IPC mechanisms including Sockets

Unit 3 - Microkernel and Unikernels (15 Hours): (Text book 4, Text book 5)

Introduction to Microkernels, Genode Architecture, Genode components, and interactions between the components. Introduction to unikernels, Xen Virtual Machine, and Architecture.

Unit 4 – FreeBSD – A Case Study of OS implementation with emphasis on Networking (15 Hours) (Text book 2 and 3)

Design Overview of FreeBSD OS, Kernel services, Process management in FreeBSD, Memory Management in FreeBSD, Network File Systems, Network Communication, Network protocols

Text Books

1) Name: "Operating System principles", 9th Edition
   Chapters: 3 to 18
   Author: Abraham Silberschatz, Peter Galvin, Greg Gagne
   Publishers: John Wiley & Sons
   ISBN Number: 1118063333

2) Name: "Linux Programming interface"
   Chapters: 4-9, 13-22, 24-37, 41-50, 56-63
   Author: Michael Kerrisk
   Publishers: No Starch Press
   ISBN Number: 978-1-59327-220-3

3) Name: "Design of 4.4 BSD Operating System"
   Chapters: 2-4, 9, 12-13
   Author: John Quarterman, Keith Bostic, Marshal McKusick, Michael Karels
   Publishers: Addison Wesley
   ISBN Number: 0-201-54979-4

4) Name: Genode Microkernel Architecture document
   Chapters/Sections: All sections
   Author: Genode Team
   URL: http://genode.org/files/53bcb8e33fe6602fed25edc3c7b922c5/manual-2015-04-27.pdf

5) Name: “The Definitive Guide to the Xen Hypervisor”
Chapters: 1-2
Author: David Chisnall
Publishers: Prentice Hall, 2008
ISBN Number: 978-0-13-234971-0

Practicals (4 hours per week * 12 weeks)

1. Linux kernel to be downloaded from www.kernel.org. Class exercises would be given on the Linux kernel
2. Genode microkernel code to be downloaded from https://github.com/cproc/genode and customizations/enhancements to be done on the microkernel code.
3. Working with Xen Hypervisor see http://wiki.xen.org/wiki/Main_Page

Outside class (4 hours per week * 12 weeks)
Reference papers

1. The papers in http://www.scs.stanford.edu/05au-cs240c/sched/

Reference Videos
1, Virtualization of Kernels – Xen - http://www.xenproject.org/help/presentations-and-videos/category/latest/xen-videos.html

Elective #J: Advanced Networking with Lab (3-1-0-4-4)

Course ID: CS 6044

Unit 1 - Mathematical models for Computer Networks (12 Hours) (Text book 1)

Introduction to Probability, Linear Algebra, Optimization, Queuing theory and Game theory, applied to networking examples.

Unit 2 - L2 switching protocols (15 Hours) (Text book 2 and 3)

VPN Configuration in detail, Spanning tree algorithm, Source Routing Bridges, Transparent bridges, Hubs, Switches, Virtual LAN's interfacing, Fast Ethernet.

Unit 3 - L3 routing protocols (15 Hours) (Text book 2 and 3)

NAT, Inter VLAN routing, MPLS, Static and Dynamic Routing Protocols

Unit 4 - L4 Transport protocol stack implementations (8 Hours): (Text book 4)

Cubic TCP Stack in Linux vs. TCP Reno vs. Compound TCP in Windows

Text Books

1) Name: Mathematical foundation of Computer Networks
Chapters: 1,3,4,6, and 7
Author: S Keshav
Publishers: Addison Wesley, April 2012
ISBN Number:978-0-321-79210-5

2) Name: Interconnections Second Edition, Bridges, Routers, Switches and Internetworking Protocols
Chapters: (Unit 2) = 2,3,4, and 5. (Unit 3) = 8,9,10,12,13, and 14
Author: Radia Perlman
Publishers: Addison Wesley, 1999
ISBN Number: 978-0-201-63448-8

3) Name: CCNA Routing and Switching Guide 8th Edition
Chapters: (Unit 2) = 1,2,3,4,5, and 11 (Unit 3) = 8,9,10, and 13
Author: Todd Lammle
Publishers: Sybex Press, 2013
ISBN Number: 978-1-118-74961-6

4) High Performance TCP / IP Networking, Concepts, Issues and Solutions
Chapters: 1,2,3,4,5,11 and 13.
Author: Mahbub Hassan and Raj Jain
Publishers: Prentice Hall India, 2005
ISBN:978-8-120-32812-9

Practicals (4 hours per week * 12 weeks)

1. Name: CCNA Routing and Switching Guide 8th Edition
   Chapters: (Unit 2) = 1,2,3,4,5, and 11 (Unit 3) = 8,9,10, and 13
   Author: Todd Lammle
   Publishers: Sybex Press, 2013
   ISBN Number: 978-1-118-74961-6

2. NS 2 (from Text book 4)
3. GNS3 for CCNA Routing and Switching
4. Mininet and Quagga (Optional).

Outside class (4 hours per week * 12 weeks)

Reference Papers:

1. Handley M., “Why the Internet just works?” - *BT Technology Journal*, vol. 24, no. 3, pp. 1358-3948, 2006, doi: 10.1007/s10550-006-0084-z
2. Schonwalder, J.; Fouquet, M.; Rodosek, G.D.; Hochstatter, I., "Future Internet = content + services + management," in *Communications Magazine, IEEE* , vol.47, no.7, pp.27-33, July 2009, doi: 10.1109/MCOM.2009.5183469
3. Ha, Sangtae, Injong Rhee, and Lisong Xu. "CUBIC: a new TCP-friendly high-speed TCP variant." *ACM SIGOPS Operating Systems Review* 42.5 (2008): 64-74.
4. Song, Kun Tan Jingmin, Q. Zhang, and M. Sridharan. "Compound TCP: A scalable and TCP-friendly congestion control for high-speed networks."*Proceedings of PFLDnet 2006* (2006).

Video Lectures:

1. Raj Jain’s lecture on Recent Advances in Networking 2013 http://www.cse.wustl.edu/~jain/cse570-13/index.html
2. Shivkumar Kalyanaraman, Internet Protocols, http://www.ecse.rpi.edu/Homepages/koushik/shivkuma-teaching/video_index.html#ip_video