NITK –Surathkal
Department of Computer Science & Engineering
Course Plan

Name of the Course: Computer Networks	**Course No:** CO300	**No. of Credits (L-T-P):** 3-1-0 (4)
Year & Semester, Section: 3rd year, V Semester	**Course Type:** Programme Core (PC)	**Academic Session:** July - December 2018

Prerequisites (if any): None

Name and Contact Details of Course Instructor:
Saumya Hegde and Mohit P. Tahiliani

Evaluation Scheme: Quizzes and Assignments - 40%, Mid Sem - 20%, End Sem - 40%

Course Objectives:
1. Introduce the fundamental aspects of Computer Networking.
2. Distinguish the application architecture from network architecture.
3. Illustrate the roles and responsibilities of every layer in the network stack.
4. Explain the working of core network protocols such as HTTP, TCP, IP{v4, v6}, etc.
5. Highlight the importance of congestion control, Quality of Service, reliability and fault tolerance in computer networking.

Course (Learning) Outcomes (COs):
CO1: Understand the fundamental aspects of Computer Networking, especially different types of network stacks.
CO2: Ability to distinguish application architecture and network architecture.
CO3: Understand the working of core network protocols, and use them to either build new network applications or optimize the performance of existing ones.
CO4: Ability to analyze, design and engineer networking protocols.

Mapping of COs with POs:
(Strength of correlation: S-Strong, M-Medium, W-Weak)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S	S	S	W	W	W	W	W	M	M	S	M
CO2	S	S	M	S	W	W	W	W	M	M	S	M
CO3	S	S	S	S	S	W	M	S	S	S	S	S
CO4	S	S	S	S	S	S	S	M	S	S	S	M

1. Teaching Learning Interaction:

No.	Topics	Detailed Syllabus	L-T-P hours
1	Different types of delays, approaches to minimize delays, decoupling bandwidth and latency, network architecture v/s application architecture, process to process communication, Services offered by TCP and UDP, application layer protocols (HTTP-x, FTP, TFTP, SMTP, DNS), IPv4 addressing, DHCP and NAT	See: Chapter 1 and 9 [Grigorik 2013] & Chapter 2 and 4.4 [Kurose and Ross 2012]	17 - 5 - 0

2	Principles of reliability and congestion control, detailed working of TCP and UDP, Routing algorithms for the Internet, and Virtual Circuits	See: Chapter 3 & 4 from [Kurose and Ross 2012]	17 - 5 - 0

2. List of Text Books & Reference Books, On-line Course Resources:

[Kurose and Ross 2012] Kurose, James F. *Computer networking: A top-down approach featuring the internet, 6/E*. Pearson Education India, 2005.

[Fall and Richard 2011] Fall, Kevin R., and W. Richard Stevens. *TCP/IP illustrated, volume 1: The protocols.* Addison-Wesley, 2011.

[Forouzan and Fegan 2002] Forouzan, B. A., & Fegan, S. C. (2002). TCP/IP protocol suite. McGraw-Hill Higher Education.

[Grigorik 2013] Grigorik, Ilya. *High Performance Browser Networking: What every web developer should know about networking and web performance*. " O'Reilly Media, Inc.", 2013.

[Online Resources] Interactive animations, Video notes from Kurose and Ross, Wireshark assignments, Presentation slides, interactive exercises from this link.

3. Suggested list of Assignments / homeworks / problems / any other:
Analysis, design and implementation of core networking protocols, starting from application layer down to network layer. One assignment is assigned per team (three members).

4. Laboratory Instructions (if any):
Network performance analysis and simulation using ns-3 and Mininet, packet monitoring using wireshark and tweaking network protocols in the Linux kernel code.

5. Assessment Pattern (Use Bloom's Taxonomy to design rubrics for evaluating student performance)

Level No.	Knowledge Level	Evaluation Component				Assessment (%)
		Quizzes (5%)	Assignments (35%)	Mid Sem (20%)	End Sem (40%)	
K1	Remember	10%	15%	10%	10%	11.75%
K2	Understand	20%	15%	20%	20%	18.25%
K3	Apply	20%	20%	20%	20%	20.00%
K4	Analyse	20%	15%	20%	20%	18.25%
K5	Evaluate	15%	15%	15%	15%	15.00%
K6	Create	15%	20%	15%	15%	16.75%
						100%