ENG EC541 Computer Communication Networks

2008-2009 Catalog Data:
Prereq: ENG EC 441. Basic delay and blocking models for computer communications: M/M/I queue, Jackson networks, and loss networks. Analysis of MAC protocols. Flow control for data traffic. TCP and active queuing mechanisms for congestion control. Traffic shaping and network calculus. Packet switch architecture and scheduling algorithms. Routing algorithms. Flow assignments and fairness. 4 cr.

Status in the Curriculum: Elective

Class/Lab Schedule:
4 hours/week

Textbooks and other required materials:
D.P. Bertsekas and R.G. Gallager, "Data Networks," 2nd Ed., Prentice-Hall, 1991

Reference:
1. S. Keshav, An engineering approach to computer networking, Addison-Wesley 1997.
2. L. Kleinrock, Queueing systems Vol. 1, Wiley, 1975.
3. M. Schwartz, Broadband integrated networks, Prentice-Hall, 1996.
4. C.S. Chang, Performance guarantees in communication networks, Springer-Verlag, 2000.
5. S.M. Ross, Stochastic Processes, 2nd Ed., Wiley, 1996.
6. R.G. Gallager, Discrete stochastic processes, Kluwer, 1996.
7. J.Y. Hui, Switching and traffic theory for integrated broadband networks, Kluwer, 1990.
8. F.P. Kelly, Reversibility and stochastic networks, Wiley, 1979

Coordinator: David Starobinski, Associate Professor, ECE

Prerequisites by topic:
EC441

Goals:
To provide students with:
1. Knowledge of models of computer communications.
2. Basic analytical skills to address performance bottlenecks in computer networks.

Course Outcomes:
As an outcome of completing this course, students should be able to:

1. Understand basic models of computer communication networks

2. Understand basic network design issues including routing and flow assignment
3. Understand contemporary packet switch architectures and algorithms
4. Understand methods of quality of service provisioning
5. Understand and analyze flow control mechanisms including TCP
6. Understand and analyze multiple access protocols including Aloha and Ethernet
7. Compute network performance metrics including delay and throughput
8. Develop numerical experiments involving simulation of networking models
9. Evaluate and devise control strategies for communication networks
10. Communicate technical ideas in written form.
11. Conduct an independent study and present its findings to the class.

Course Outcomes mapped to Program Outcomes:

Program Outcomes	A	B	C	D	E	F	G	H	I	J	K
Course Outcomes	**1-6**	**8**	**2**		**7-9**		**10-11**	**10**			**8,11**
Emphasis (1-5)	**5**	**3**	**3**		**5**		**4**	**2**			**3**

Contribution of Course to Meeting the Professional Component:
Engineering topics: 100%
Math & Basic Science: 0%
General Education: 0%

Prepared by: David Starobinski **Date**: June 2009