<table>
<tr><td>Course Title</td><td>Network Algorithmics</td><td>Course No</td><td colspan="4">old COM507</td></tr>
<tr><td rowspan="2">Department/
Specialization</td><td rowspan="2">Computer Science
and Engineering</td><td rowspan="2">Credits</td><td>L</td><td>T</td><td>P</td><td>C</td></tr>
<tr><td>3</td><td>1</td><td>0</td><td>4</td></tr>
<tr><td>Faculty proposing the course</td><td>Noor Mahammad Sk</td><td>Status</td><td colspan="2">Core □</td><td>Elective</td><td>■</td></tr>
<tr><td>Offered for</td><td>M.Tech, PhD -CSE, ECE</td><td>Type</td><td colspan="2">New □</td><td>Revision</td><td>■</td></tr>
<tr><td>To take effect from</td><td></td><td rowspan="2">Submitted for approval</td><td colspan="4" rowspan="2">____Senate</td></tr>
<tr><td>Prerequisite</td><td>Computer Networks, Computer Organization, Operating System</td></tr>
<tr><td>Learning Objectives</td><td colspan="6">To make familiar with the set of techniques to overcome implementation bottlenecks at all network devices and to provide a set of principles and models to help overcome current and future networking bottlenecks.</td></tr>
<tr><td>Learning Outcomes</td><td colspan="6">The student is able to implement efficient algorithms and architectures for packet processing. Can able to design high Speed packet processing network systems such as bridges, switches, routers and firewalls.</td></tr>
<tr><td>Course Contents (with approximate breakup of hours for lecture/ tutorial/practice)</td><td colspan="6">Introduction to Network Algorithmics (NA) – Bottlenecks and techniques (3hrs +2T).

Network Implementation Models – Protocols, Hardware, network device architectures and operating Systems (4hrs + 3T).

Fifteen NA Implementation Principles and Actions (6hrs + 2T).

Demultiplexing and Protocol Processing (6hrs + 2T).

Exact-Match Lookups, Prefix-Match Lookups (6hrs + 2T).

Packet Classifications and Routers as Distributed Systems (6hrs + 2T).

High Speed Packet Classification Hardware Architectures – TCAM Razor, Bit Weaving, All-Match Redundancy Removal, Sequential Decomposition, and Topological Transformations. (11hrs)</td></tr>
<tr><td>Essential Reading</td><td colspan="6">George Varghese, “Network Algorithmics – An Interdisciplinary Approach to Designing Fast Networked Devices”, Morgan Kaufman Publishers, 2nd Edition, 2022, ISBN: 9780128099278.</td></tr>
<tr><td>Supplementary Reading</td><td colspan="6">1. Chad R. Meiners, Alex X. Liu, Eric Torng, “Hardware Based Packet Classification for High Speed Internet Routers”, Springer Publisher, 1st Edition, 2010. ISBN: 9781441966995.
2. Deepankar Medhi, Karthikeyan Ramasamy, Jane Zupan, “Network Routing: Algorithms, Protocols, and Architectures”, Morgan Kaufman Publishers, 2nd Edition, 2017, ISBN: 9780128007372.</td></tr>
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