ACADEMIC AFFAIRS OFFICE
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

No. Acd./ 736 /IAPC-91 Dated: February 06, 2021

Head, Department of Computer Science & Engg.

The IAPC (91st meeting, under Item No. 91.2.3) has approved the modified syllabi of following core courses (PCC):

1. CSN-341: Computer Networks **(Appendix-A)**
2. CSN-503: Advanced Computer Networks **(Appendix-B)**

Reeti

Assistant Registrar (Curriculum)

Encl: as above

Copy to (through e mail):-

1. All faculty
2. All Heads of Departments/ Centres
3. Dean, Academic Affairs
4. Associate Dean of Academic Affairs (Curriculum)
5. Channel I/ Academic webpage of iitr.ac.in

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT/CENTRE: Computer Science and Engineering

1. **Subject Code:** CSN-341 **Course Title:** Computer Networks
2. **Contact Hours:** **L:** 3 **T:** 1 **P:** 0
3. **Examination Duration (Hrs.):** **Theory:** 3 **Practical:** 0
4. **Relative Weightage:** **CWS:** 20-35 **PRS:** 0 **MTE:** 20-30 **ETE:** 40-50 **PRE:** 0
5. **Credits:** 4 **6. Semester:** Autumn **7. Subject Area:** PCC
8. **Pre-requisite:** Knowledge of data structures, algorithms, and programming.
9. **Objective:** To familiarize students with the layered design and protocols of computer networks including the Internet.
10. **Details of the Course**

S.No.	Contents	Contact hours
1.	**Introduction:** Use of Computer Networks, Network Hardware and Software; Layering, Reference Models and their comparison.	3
2.	**Physical Layer:** Theoretical basis for Data Communication, Transmission Media and Impairments, Switching Systems.	4
3.	**Data Link Layer:** Data Link Layer Services, Framing, Error detection and correction, Elementary and Sliding Window Protocols, Examples of Data Link Layer Protocols, Medium Access Control Sub Layer: Channel allocation problem, Multiple Access Protocols, Ethernet, Data Link Layer Switching.	7
4.	**Network Layer:** Network Layer Services, Routing algorithms, Congestion control, Internetworking, IP and IP addressing.	7
5.	**Transport Layer:** Transport layer Services, Elements of Transport Protocols, TCP and UDP.	7
6.	**Application Layer:** Layered Architecture, Client Server Model, Peer to Peer Architecture, Application Layer Services, DNS, WWW, Email, SMTP, HTTP, FTP, Telnet, Cookies.	7
7.	**Network Security:** Introduction, Security Goals, attacks, Confidentiality, Ciphers, Digital Signature, Internet Security, Firewalls, Basics of Intrusion Detection Systems	7
Total		**42**

11. **Suggested Books:**

S.No.	Name of Authors/Book/Publisher	Year of Publication / Reprint
1.	Tanenbaum, A.S, “Computer Networks”, 5th Ed., Pearson Education.	2013
2.	Forouzan, B.A., “Computer Networks: A Top-Down Approach”, SIE edition, Tata McGraw-Hill.	2012
3.	Stallings W., “Data and Computer Communication”, 8th Ed., Pearson Education.	2013
4.	Kurose, J.F. and Ross, K.W., "Computer Networking: A Top-Down Approach", 6th Ed., Pearson Education.	2017
5.	Comer, D.E., “Computer Networks and Internets”,6th Ed., Pearson Education.	2018

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPARTMENT/CENTRE: Computer Science and Engineering

1. **Subject Code:** CSN-503 **Course Title:** Advanced Computer Networks
2. **Contact Hours:** **L:** 3 **T:** 1 **P:** 0
3. **Examination Duration (Hrs.):** **Theory:** 3 **Practical:** 0
4. **Relative Weightage:** **CWS:** 20-35 **PRS:** 0 **MTE:** 20-30 **ETE:** 40-50 **PRE:** 0
5. **Credits:** 4 **6. Semester:** Both **7. Subject Area:** PCC
8. **Pre-requisite:** Knowledge of Computer Networks
9. **Objective:** To familiarize students with the recent advances in computer networks including their architectures and protocols.

10. **Details of the Course**

S.No.	Contents	Contact hours
1.	**Introduction:** Basic networking concepts revisited. layering and link layer, network layer, advances in routing, integrated and differentiated services, end-to-end layer, advances in congestion control, and MAC issues.	**8**
2.	**Protocols and Network Management:** Flow and congestion control, TCP variants, TCP modeling, active queue management. network traffic modeling, network measurement, simulation issues, and performance analysis of networks.	**5**
3.	**Mobile and Wireless Networks:** BLE, 2G, 3G, 4G, 5G, IEEE 802.11, DWDM, routing, mobile IP, mobile TCP, group communications, and multicast.	**8**
4.	**Ad-hoc Networks:** AODV, Wireless Sensor Networks (WSN) – cross layer sensor data dissemination, Internet-of-Things (IoT) – applications, architecture, enabling technologies, and integrating to cloud.	**5**
5.	**Emerging Networks:** DTN, RON, P2P, CDN, web caching, data centers and cloud, Online Social Networks (OSN). VoIP, SIP, and video over P2P, Multimedia over Internet.	**10**
6.	**Network Security:** Web security, e-mail security, IP security, cloud security, wireless security, P2P security, OSN security, CDN security, and IoT security.	**6**
Total		**42**

11. **Suggested Books:**

S.No.	Name of Authors/Book/Publisher	Year of Publication / Reprint
1.	J.F. Kurose and K.W. Ross, Computer networking: A top-down approach, 6th edition, Adison Wesley.	2013
2.	L.L. Peterson and BS. Davie, Computer Networks ISE: A System Approach, 5th edition, Morgan Kaufman.	2011
3.	B.A. Forouzan, Data communication & networking, 5th Edition, Tata Mc-Graw Hills.	2013
4.	Tim Mather, Subra K., and Shahed Latif, Cloud Security and Privacy, Oreilly.	2009
5.	Gharlie Kaufman, Radia Perlman, Mike Speciner, Network Security Private Communication in a Public World, PHI.	2002