Computer Science Engineering

Semester V						
S. No	**Course code**	**Course name**	**L**	**T**	**P**	**C**
1	CS303T	Operating Systems	3	0	0	6
2	CS305T	Computer Networks	3	0	0	6
3	CS303L	Computer Networks Laboratory	0	0	3	3
4	CS302L	Operating Systems Laboratory	0	0	3	3
5	BB101T	Introduction to Modern Biology	3	0	0	6
6		Electives	3	0	0	6
7	HS201T	Economics	3	0	0	6
Total credits						**36**

Computer Science Engineering

1	**Title of the course** (L-T-P-C)	**Operating Systems (3-0-0-6)**
2	**Pre-requisite courses(s)**	Computer Architecture
3	**Course content**	Process Management, Memory Management, Storage Management, Protection and Security, Virtual Machines, Distributed Systems
4	**Texts/References**	**1.** Avi Silberschatz, Peter Baer Galvin, Greg Gagne, ``Operating Systems Concepts" 9th edition. Wiley. **2.** Andrew S. Tanenbaum, Herbert Bos, ``Modern Operating Systems", 4th edition. Pearson

1	**Title of the course** (L-T-P-C)	**Computer Networks Laboratory** **(0-0-3-3)**
2	**Pre-requisite courses(s)**	Nil
3	**Course content**	Experiments to support study of the Internet protocol stack: (a) Experimental study of application protocols such as HTTP, FTP, SMTP, using network packet sniffers and analyzers such as Ethereal. Small exercises in socket programming in C/C++/Java. (b) Experiments with packet sniffers to study the TCP protocol. Using OS (netstat, etc) tools to understand TCP protocol FSM, retransmission timer behavior, congestion control behaviour. (c) Introduction to ns2 (network simulator) - small simulation exercises to study TCP behavior under different scenarios. (d) Setting up a small IP network - configure interfaces, IP addresses and routing protocols to set up a small IP network. Study dynamic behaviour using packet sniffers (e) Experiments with ns2 to study behaviour (especially performance of) link layer protocols such as Ethernet and 802.11 wireless LAN.
4	**Texts/References**	Nil

1	**Title of the course** (L-T-P-C)	**Introduction to Modern Biology** **(2-1-0-6)**
2	**Pre-requisite courses(s)**	Nil
3	**Course content**	Quantitative views of modern biology. Importance of illustrations and building quantitative/qualitative models. Role of estimates. Cell size and shape. Temporal scales. Relative time in Biology. Key model systems – a glimpse. Management and transformation of energy in cells. Mathematical view – binding, gene expression and osmotic pressure as examples. Metabolism. Cell communication. Genetics. Eukaryotic genomes. Genetic basis of development. Evolution and diversity. Systems biology and illustrative examples of applications of Engineering in Biology.
4	**Texts/References**	Campbell Biology 12th edition, Pearson publication by Lisa Urry,Michael Cain,Steven Wassserman

1	**Title of the course** (L-T-P-C)	**Economics (2-1-0-6)**
2	**Pre-requisite courses(s)**	--
3	**Course content**	Basic economic problems. resource constraints and Welfare maximizations. Nature of Economics: Positive and normative economics; Micro and macroeconomics, Basic concepts in economics. The role of the State in economic activity; market and government failures; New Economic Policy in India. Theory of utility and consumer choice. Theories of demand, supply and market equilibrium. Theories of firm, production and costs. Market structures. Perfect and imperfect competition, oligopoly, monopoly. An overview of macroeconomics, measurement and determination of national income. Consumption, savings, and investments. Commercial and central banking. Relationship between money, output and prices. Inflation - causes, consequences and remedies. International trade, foreign exchange and balance payments, stabilization policies : Monetary, Fiscal and Exchange rate policies.
4	**Texts/References**	**1.** P. A. Samuelson & W. D. Nordhaus, Economics, McGraw Hill, NY, 1995. **2.** A. Koutsoyiannis, Modern Microeconomics, Macmillan, 1975. R. Pindyck and D. L. Rubinfeld, Microeconomics, Macmillan publishing company, NY, 1989. **3.** R. J. Gordon, Macroeconomics 4th edition, Little Brown and Co., Boston, 1987. **4.** William F. Shughart II, The Organization of Industry, Richard D. Irwin, Illinois, 1990. **5.** R.S. Pindyck and D.L. Rubinfeld. Microeconomics The (7th Edition), Pearson Prentice Hall, New Jersey, 2009. **6.** R. Dornbusch, S. Fischer, and R. Startz. Macroeconomics (9th Edition), McGraw-Hill Inc. New York, 2004.

1	**Title of the course** (L-T-P-C)	**Computer Networks** **(3-0-0-6)**
2	**Pre-requisite courses(s)**	Nil
3	**Course content**	Design of Computer Networking protocols at all layers: transmission media, data link protocols, media access control, routing and congestion control, admission control, traffic shaping and policing, Internet working (IP) and transport layer protocols (TCP). Performance analysis of networks.
4	**Texts/References**	**1.** Data and Computer Communications, 6th edition, by W. Stallings, Prentice Hall, 2000. **2.** Computer Networks, 4th edition, by A. S. Tannenbaum, Prentice Hall, 2003. **3.** Data Communications, Computer Networks and Open Systems, 4th edition, by F. Halsall, Addison-Wesley, 1996. **4.** High Performance Communication Networks, by Walrand and Varaiya, Morgan Kaufman, 1996. **5.** Internet working with TCP/IP: Principles, Protocols, Architecture, 3rd edition, by D. E. Comer, Prentice Hall, 1996. **6.** TCP/IP Illustrated Vol. I, by W. R. Stevens, Addison Wesley, 1994.

1	**Title of the course** (L-T-P-C)	**Operating Systems Laboratory (0-0-3-3)**
2	**Pre-requisite courses(s)**	Computer Architecture
3	**Course content**	Laboratory Assignments related to the topics covered in the theory course: Process Management, Memory Management, Storage Management, Protection and Security, Virtual Machines, Distributed Systems
4	**Texts/References**	1. **Avi Silberschatz, Peter Baer Galvin, Greg Gagne**, ``Operating Systems Concepts" 9th edition. Wiley. 2. **Andrew S. Tanenbaum, Herbert Bos**, ``Modern Operating Systems", 4th edition. Pearson**.**