

Computer Science Engineering

Semester VI

S.No	Course code	Course name	L	T	P	C
1	CS 348	<u>Computer Networks</u>	3	0	0	6
2	CS 323	<u>Compilers</u>	3	0	0	6
3	CS 316	<u>Compilers Lab</u>	0	0	3	3
4	CS 315	<u>Computer Networks Laboratory</u>	0	0	3	3
5		HSS Elective II*	3	0	0	6
6	CE 301	<u>Environmental studies</u>	3	0	0	6
7		Elective III / R&D I/II#	3	0	0	6
<u>Total credits</u>						<u>36</u>

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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	<ol style="list-style-type: none">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.

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1	Title of the course (L-T-P-C)	Compilers (3-0-0-6)
2	Pre-requisite courses(s)	Exposure to Data Structures and Algorithms, Computer Architecture, Automata Theory
3	Course content	The compiled and interpreted execution models. Lexical analysis and parsing using lex and yacc. LR parsers, Scope and visibility analysis. Data layout and lifetime management of data. Runtime environment. Dynamic memory allocation and Garbage collection. Translation of expressions, control structures, and functions. Code generation and introduction to optimizations (local and global). Lattice Theory, Optimizations- dataflow, control flow, reaching definition, liveness analysis, code transformation-tiling, fusion.
4	Texts/References	<ol style="list-style-type: none">1. Alfred V. Aho, Monica S. Lam, Ravi Sethi and Jeffrey D.Ullman: Compilers: Principles, Techniques, and Tools, 2/E, AddisonWesley 2007.2. Andrew Appel: Modern Compiler Implementation in C/ML/Java, Cambridge University Press, 20043. Dick Grune, Henri E. Bal, Cerial J.H. Jacobs and Koen G. Langendoen: Modern Compiler Design, John Wiley & Sons, Inc. 2000.4. Michael L. Scott: Programming Language Pragmatics, Morgan Kaufman Publishers, 2006.5. Fisher and LeBlanc: Crafting a Compiler inC.

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1	Title of the course (L-T-P-C)	Compilers Lab (0-0-3-3)
2	Pre-requisite courses(s)	Exposure to Data Structures and Algorithms, Computer Architecture, Automata Theory, and a programming language such as C/C++/Java.
3	Course content	Design and implementation of a scanner using scanner generator. Design and implementation of a parser using parser generator. Symbol table generation, Semantic actions for expressions, control structures, and functions. Implementing liveness analysis and applying it to register allocation.
4	Texts/References	<ol style="list-style-type: none">1. Alfred V. Aho, Monica S. Lam, Ravi Sethi and Jeffrey D.Ullman: Compilers: Principles, Techniques, and Tools, 2/E, AddisonWesley 2007.2. Andrew Appel: Modern Compiler Implementation in C/ML/Java, Cambridge University Press, 20043. Dick Grune, Henri E. Bal, Cerial J.H. Jacobs and Koen G. Langendoen: Modern Compiler Design, John Wiley & Sons, Inc. 2000.4. Michael L. Scott: Programming Language Pragmatics, Morgan Kaufman Publishers, 2006.5. Fisher and LeBlanc: Crafting a Compiler in C.

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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: <ol style="list-style-type: none">1. 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.2. Experiments with packet sniffers to study the TCP protocol. Using OS (netstat, etc) tools to understand TCP protocol FSM, retransmission timer behavior, congestion control behavior.3. Introduction to ns2 (network simulator) - small simulation exercises to study TCP behavior under different scenarios.4. Setting up a small IP network - configure interfaces, IP addresses and routing protocols to set up a small IP network. Study dynamic behavior using packet sniffers.5. Experiments with ns2 to study behavior (especially performance of) link layer protocols such as Ethernet and 802.11 wireless LAN.
4	Texts/References	Nil

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1	Title of the course (L-T-P-C)	Environmental studies (3-0-0-6)
2	Pre-requisite courses(s)	Nil
3	Course content	<p>Module A: Natural Resources, Ecosystems, Biodiversity and its conservation: Natural resources and ecosystems, Forest, grassland, desert and aquatic ecosystems, biodiversity at global, national and local levels, conservation of biodiversity</p> <p>Module B: Air Pollution Introduction to understanding air quality management, fundamental processes of meteorology, Air Pollutants – Gaseous and particulate, Criteria for pollutants, ambient and source standards, Aerosols: Characterisation of aerosols, size distributions, measurement methods; Transport behaviour: diffusion, sedimentation, inertia; Visibility; principles of particulate control systems.</p> <p>Module C: Water Treatment Discussion of water quality constituents and introduction to the design and operation of water and wastewater treatment processes.</p> <p>Module D: Solid Waste Management and Climate Change Different aspects of solid and hazardous waste management. Climate change and greenhouse gas emissions, technologies would reduce the greenhouse gas emissions. Climate change and its possible causes.</p> <p>Module E: Sociology/Environmentalism Description: Environmentalism in sociological tradition, Sustainability, North-South divide, Political economy approaches in environmental studies, Debates over environmental issues.</p> <p>Module F: Economics Energy economics and financial markets, Market dynamics, Energy derivatives, Energy Efficiency; Sustainable Development: Concept, Measurement & Strategies, Interaction between Economic Development and the Environment</p> <p>Module G: Philosophy Environmental ethics, Deep ecology, Practical ecology, Religion and attitude towards environmental ethics, Ecofeminism and its evolution.</p> <p>Module H: Field work and project: visit to a local area to document environmental assets, case studies of a simple ecosystem and group discussions on current environmental issues.</p>
4	Texts/References	<ol style="list-style-type: none"> 1. Cunningham W.P. and Cunningham M.A. (2002), Principles of Environmental Science, Tata McGraw-Hill Publishing Company, New Delhi. 2. Dasgupta, P. and Maler, G. (eds.), (1997), The Environment and Emerging Development Issues, Vol. I, Oxford University Press, New Delhi. 3. Jackson, A.R.W. and Jackson, J.M. (1996), Environmental Sciences: The Environment and Human Impact, Longman Publishers. 4. Nathanson, J.A., (2002), Basic Environmental Technology, Prentice Hall of India, New Delhi. 5. Redclift, M. and Woodgate, G. (eds.), (1997), International Handbook of Environmental Sociology. 6. Srivastava, K.P. (2002), An Introduction to Environmental Study, Kalyani Publishers, Ludhiana. 7. Review articles from literature.