# Tutorial on Computing: Technological Advances, Social Implications, Ethical and Legal Issues

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**Abstract.** Computing and information technology have made significant advances. The use of computing and technology is a major aspect of our lives, and this use will only continue to increase in our lifetime. Electronic digital computers and high performance communication networks are central to contemporary information technology. The computing applications in a wide range of areas including business, communications, medical research, transportation, entertainments, and education are transforming local and global societies around the globe. The rapid changes in the fields of computing and information technology also make the study of ethics exciting and challenging, as nearly every day, the media report on a new invention, controversy, or court ruling.

This tutorial will explore a broad overview on the scientific foundations, technological advances, social implications, and ethical and legal issues related to computing. It will provide the milestones in computing and in networking, social context of computing, professional and ethical responsibilities, philosophical frameworks, and social, ethical, historical, and political implications of computer and information technology. It will outline the impact of the tremendous growth of computer and information technology on people, ethics and law. Political and legal implications will become clear when we analyze how technology has outpaced the legal and political arenas.

**Short Biography.** Dr. Narayan C. Debnath has been a Full Professor of Computer Science since 1989 and currently the Chairman of Computer Science at Winona State University, Minnesota, USA. He is also serving as the President of the International Society for Computers and Their Applications (ISCA). Dr. Debnath is a recipient of a Doctorate degree in Computer Science and a Doctorate degree in Applied Physics (Electrical Engineering). In the past, he served as the President, Vice President, and Conference Coordinator of the International Society for Computers and Their Applications (ISCA), and has been a member of the ISCA Board of Directors since 2001. He served as the Acting Chairman of the Department of Computer Science at Winona State University and received numerous Honors and Awards. During 1986–1989, Dr. Debnath was a faculty of Computer Science at the University of Wisconsin-River

Falls, USA, where he was nominated for the National Science Foundation Presidential Young Investigator Award in 1989.

Dr. Debnath has taught a wide range of undergraduate and graduate courses in computer science including Software Engineering, Software Testing, Theory of Computation, Compiler Design, and Principles of Programming Languages. He has made original research contributions on Software Engineering Models, Metrics and Tools, Software Testing, Software Management, and Information Science, Technology and Management. For the past several years, he has been working on research problems involving the development of software models, software complexity metrics and tools, Software testing theory, techniques and tools, Software design tools, techniques and environments, and Information technology and management. Dr. Debnath is an author or co-author of over 300 publications in numerous refereed journals and conference proceedings in Computer Science, Information Science, Information Technology, System Sciences, Mathematics, and Electrical Engineering. Since 2005, he has been serving as the Guest Editor of the special issues of the Journal of Computational Methods in Science and Engineering (JCMSE) published by the IOS Press, the Netherlands.

Professor Debnath has made numerous teaching and research presentations at various national and international conferences, industries, and teaching and research institutions in Asia, Australia, Europe, North America, and South America. He has been serving as an international teaching and research advisor/coordinator of the Master of Software Engineering Program at the National Universities in Argentina, South America, since 2000. He has offered courses and workshops on Software Engineering and Software Testing at the universities in South America, Asia, and Middle East.

Dr. Debnath served as the General Chair, Program Chair, invited Keynote Speaker, Tutorial Chair, and technical Track or Session Organizer and Chair of the international conferences sponsored by various professional societies including the IEEE, IEEE Computer Society, the Society of Industrial and Applied Mathematics (SIAM), International Association of Computer and Information Science (ACIS), International Association for Science and Technology in Education (IASTED), Arab Computer Society, and the International Society for Computers and Their Applications (ISCA). Dr. Debnath is a member of the ACM, IEEE Computer Society, Arab Computer Society, and a senior member of the ISCA.

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