Master of Science in Information Technology
In collaboration with Carnegie Mellon University, USA

SSN
School of Advanced Software Engineering

Carnegie Mellon
The SSN School of Advanced Software Engineering (SSN SASE) was established by Shiv Nadar - Chairman, HCL Technologies Ltd. The SSN Institutions are an outcome of Shiv Nadar's deep commitment to give back to the society that nurtured him. SSN Institutions reflect the ideals of the founder to bring world class education to India and make it available to meritorious students from any economic strata.

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Carnegie Mellon University

Carnegie Mellon is a private research university with a distinctive mix of programs in engineering, computer science, robotics, business, public policy, fine arts and the humanities. More than 10,000 undergraduate and graduate students pursue an education characterized by a focus on creating and implementing solutions for real problems, interdisciplinary collaboration, and innovation. Small student-to-faculty ratios provide an opportunity for close interaction between students and professors. While technology is pervasive on its 144-acre campus, Carnegie Mellon is distinctive among leading research universities for its world-renowned programs. Visit http://www.cmu.edu/ for more information.

The professional programs in software engineering at Carnegie Mellon are designed for software development professionals who want to expand their knowledge of the discipline. Founded as a joint effort between Carnegie Mellon's School of Computer Science and the Software Engineering Institute, the programs offer experience from both academic and industrial perspectives. Through a challenging curriculum, innovative courses and a technical emphasis, students learn and apply practices, tools and techniques in a real-world project environment. The programs are designed to produce "Agents of Change" --- individuals who will lead and improve the industry and the state of the practice in the years to come. More information about software engineering programs can be obtained at http://mse.isri.cmu.edu/software-engineering/

The professional programs in software engineering continue to promote global partnerships with leading companies and academic institutions. SSN SASE is the academic partner offering Carnegie Mellon's MSIT program in India.

Visit http://mse.isri.cmu.edu/software-engineering/web3-Partners/International%20Partners/SASE.html
The project-based curriculum has been a staple in the software engineering program since its inception at Carnegie Mellon in 1989. At the program’s center is the student’s involvement in a real-world project under the direct observation of project mentors and technical advisors. Students are evaluated on how well they are able to apply what they have mastered in the coursework to the project. Three primary areas of evaluation are process, the product produced, and the ability of the students to present the project to their faculty.

Students are evaluated at two key periods points in their project engagement. These mid- and end-semester presentations are used to assess the student’s grasp of new concepts and depth of understanding. This joint-evaluation of the student’s progress is a critical process to uphold the academic integrity of the program and to ensure that only the highest-quality software engineers are produced with the following essential industry skills:

- Problem solving
- Ability to learn and adopt new technology
- Interpersonal and team-building

SSN School of Advanced Software Engineering, in collaboration with Carnegie Mellon, offers the Master of Science in Information Technology- Software Engineering (MSIT-SE) degree program. It is one and a half year full-time residential program. The first year is offered at SSN School of Advanced Software Engineering. In the first year of study, SSN SASE experienced faculty and practicing professionals conduct the courses using Carnegie Mellon courseware. During this period students complete pre-requisite, core, and elective courses, as well as project work. The faculty of both universities continually evaluate the students.

Upon successful completion of the one-year curriculum in India, students receive a certificate from SSN SASE. Thereafter, they proceed to Carnegie Mellon, where they complete additional degree requirements over two semesters of study. While in Pittsburgh, students take several elective courses and complete project work under the supervision of Carnegie Mellon faculty. Students intent on finishing their study at Carnegie Mellon must obtain a US visa to do so.
The Software Engineering Specialization

The Software Engineering Specialization draws from Carnegie Mellon's strengths in technology, innovation, and interdisciplinary collaboration. It provides students with a solid foundation in the principles of software engineering and insight into the important business issues of the day.

Most of the courses are drawn from Carnegie Mellon's highly ranked School of Computer Science. The core is a content-based curriculum designed to enable students to 'learn how to learn' in the rapidly evolving software development field. The capstone practicum is an opportunity to apply core course material to a substantial project in the workplace.

The curriculum in SSN SASE includes the following:

- **Five core courses**
  - Managing Software Development
  - Methods: Deciding What to Design
  - Models of Software Systems
  - Architectures for Software Systems
  - Analysis of Software Artifacts

- **One Prerequisite Course**
  - Personal Software Process

- **Two Electives**
  - Software Process Definition
  - Software Measurement

- **Practicum Project**
  - Year-long Practicum project

The students take three core courses in the fall and two core courses in the spring as well as two electives. Additionally, students work on the Practicum project for one year, applying the skills they have acquired in their courses to solve real-world problems.

Visit [http://www.sase.ssn.edu.in/msit-se.html](http://www.sase.ssn.edu.in/msit-se.html) for details.

“The project at Carnegie Mellon served not only as a platform to demonstrate the cognizance I earned in SSN SASE part of the program but also as a means of solving problems and implementing the academic learnings. In short, if there is some thing I can recount as the best things to have happened in my life, they are: My Family, SSN SASE – Carnegie Mellon MSIT program”

Pradeep Kumar, Oracle, USA
MSIT-SE batch 2005

“For the first time in my academics, I was shown the length and breadth of Software Engineering (SE) by professors at SSN SASE. The courses are so structured that they gradually took me up the SE ladder. The “Learning by Doing” paradigm is the unique nature of this program which enabled me to grasp all aspects of software engineering along with technical, managerial, people skills and customer interaction”.

Rajkumar P
Quality Analyst, iSoft UK
MSIT-SE Batch 2003
CORE COURSES

Models of Software Systems

Scientific foundations for software engineering depends upon the use of precise, abstract models for characterizing and reasoning about properties of software systems. This course considers many of the standard models for representing sequential and concurrent systems, such as state machines, algebras, and traces. The course demonstrates how different logics can be used to specify properties of software systems, such as functional correctness, deadlock freedom, and internal consistency. Concepts such as composition mechanisms, abstraction relations, invariants, non-determinism, inductive definitions and denotational descriptions are recurrent themes throughout the course.

Methods: Deciding What to Design

Practical development of software requires an understanding of successful methods for bridging the gap between a problem to be solved and a working software system. This course focuses specifically on methods that guide the software engineer from requirements to code. The course provides students with both a broad understanding of the space of current methods and the specific skills needed to use these methods.

“SSN SASE surely stood by the words of “Learning by Doing” as I never felt that I am sitting in a classroom and attending unidirectional lectures. The faculty at SSN always had me and my colleagues involved in-class discussions. Even the method of evaluation had lots of components like case studies, presentations, group discussions and debates. All in all, the program at SSN SASE is “THE” stepping stone of success at CMU and the life to follow”.

Amit Girish Boob
Director, Boob Softwares N Solutions Pvt. Ltd.
MSIT-SE batch 2005
Managing Software Development

Large scale software development requires the ability to manage resources, both human and computational, through control of the development process. This course provides the knowledge and skills necessary to lead a project team, understand the relationship of software development to overall product engineering, estimate time and costs, and adopt the suitable software process for the project. Topics include life cycle models, requirements elicitation and documentation, estimation of size and effort, risk management, planning and tracking, configuration control, environments, and quality assurance, all of which are used broadly in other core courses and the Practicum project.

Analysis of Software Artifacts

Our ability to build, maintain, and reuse software systems relies on our ability to effectively analyze the products of software development. This course addresses numerous types of software artifacts (specifications, designs, code, etc.) and covers both traditional analyses, such as verification, validation, and testing, as well as promising new approaches, such as model checking, abstract execution and new type systems. The focus is on the analysis of function (for finding errors in artifacts and to support maintenance and reverse engineering), as well as other kinds of analysis (such as performance and security).
Architectures for Software Systems

Successful design of complex software systems requires the ability to describe, evaluate, and create systems at an architectural level of abstraction. This course introduces architectural design of complex software systems. The course considers commonly-used software system structures, techniques for designing and implementing these structures, models and formal notations for characterizing and reasoning about architectures, tools for generating specific instances of an architecture, and case studies of actual system architectures. It teaches the skills and background students need to evaluate the architectures of existing systems and to design new systems in principled ways using well-founded architectural paradigms.

Evaluation

For each course, learning objectives are defined and corresponding assignments are developed. Students are evaluated continuously through these assignments and mini projects to ensure that the students meet the learning objectives.

SSN SASE and Carnegie Mellon faculty jointly evaluate and review the student's course and project work, on-site and via VTC capability.
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Ms. Kala Vijayakumar
President, SSN Institutions

Ms. Kala Vijayakumar obtained her Master of Science degree with specialization in Mathematics with honors from Stella Maris College, Madras University. She has a mix of Entrepreneur, IT profession and Academic Management experience. She worked in the software development projects in HCL technologies, playing roles like programmer and team leader. Ms. Kala Vijayakumar has been associated with SSN Institutions from the inception. The objectives of the institutions are to provide world class education, create the right type of learning ambience and make the education affordable to the meritorious students through large number of scholarships. She is now president of SSN Institutions. She implements the vision of the founder, Shiv Nadar by providing day-to-day management and guidance in running the institutions.

Dr. Shashikant V. Albal
Director, SSN SASE

Dr. Shashikant Albal obtained his PhD in CAD from IIT, Bombay in 1978. He has a mix of academic, research and software industry experience. He has worked in a variety of roles and handled responsibilities of training, technology, R&D, and software project management. He has worked in Tata Consultancy Services, Mahindra British Telecom, and SYTELE before joining SSN. While in MBT, he had worked in association with Carnegie Mellon University in 1996 and had formed an academic institution.

Besides holding the reigns as a director of SSN SASE from its inception (Nov 2001), he teaches a number of subjects including Managing Software Development, Methods of Software Development, Software Process Definition, Software Measurement, and Personal Software Process. At present he is also focussing on utilization of technology advancements in innovative teaching-learning process. He is fond of pets and indulges in philosophical reading when time permits.

Dr. C. Aravindan
Professor of Computer Science and Assistant Director

Dr. C. Aravindan obtained his PhD in Computer Science (Knowledge and Data base updates) from Asian Institute of Technology, Bangkok, Thailand in 1995. After completing his PhD he worked at University of Koblenz, Koblenz, Germany, as a Research scientist from 1995 to 1997. He then worked at Mepco Schlenk Engineering College, Sivakasi, India, as Professor and Head of Computer Science department from 1998 to 2002.

Aravindan’s research interests include logic programming, soft computing, and high-performance computing. He is guiding 15 research scholars in these fields. He has completed three funded projects, and currently investigating two projects. He has published about 25 papers in international journals and conferences. Aravindan joined SSN SASE in July 2002 and presently he is Assistant Director, SSN SASE. He teaches Models of Software Systems which is a core course for MSIT-SE program.

Dr. David Garlan
Professor of Computer Science
Director of Professional Programs in Software Engineering
Carnegie Mellon University

Dr. Garlan is a professor of computer science and director of the Professional Programs in Software Engineering in the School of Computer Science. His research interests include software architecture, self-adaptive systems, formal methods, and software development environments. Garlan is considered to be one of the founders of the field of software architecture, and in particular formal representation and analysis of architectural designs, for which he was awarded a Stevens Award Citation in 2005. He has published numerous articles and co-authored two books about software architecture.

Garlan received his Ph.D. from Carnegie Mellon and a bachelor’s degree from the University of Oxford. He worked in the Computer Research Labs of Tektronix Inc. for three years before joining Carnegie Mellon’s faculty.

Mr. Mel Rosso-Llopart
Associate Director of professional programs in Software Engineering
Carnegie Mellon University

Mel Rosso-Llopart has experience in research and development, managing project communications, and fiscal project management for large and small projects. He is also well versed in a variety of computing environments, has developed large network configurations, and developed large database applications. Recently Mr. Rosso-Llopart worked for a local company Adtranz in developing complex embedded software system for the rail transit industry.

He earned Bachelor’s degrees in Physics, Biology, and Computer Science at the University of California, and holds a Masters of Software Engineering from the School of Computer Science at Carnegie Mellon University. Mr. Rosso-Llopart is also a registered instructor in PSP from the Software Engineering Institute.
This fully residential program is conducted by SSN School of Advanced Software Engineering at its sprawling campus, located in the "cyber corridor" of Chennai, Tamil Nadu, India.

- Hostel facilities for men and women, with single occupancy
- State of the art computing facilities and labs
- Wi-fi enabled campus with round-the-clock internet connectivity
- Video conferencing facility
- Host of software, including the complete IBM Rational CASE Tools Suite.
- Central library facility
- Sports Complex indoor stadium, gyms, outdoor fields
- Indoor Auditorium 1000 seats capacity, fully air-conditioned

The Program offers excellent prospects for placement with leading IT organizations in India and U.S.A.

- Track record of 100% placements.
- Average salary of USD 95,000 for students from the last batch placed in US and UK
- List of employers include
  - Oracle
  - SalesForce.com
  - Cisco
  - Intel
  - Microsoft
  - IBM
  - Infosys
  - Wipro
  - HCL

Shiv Nadar - Chairman, HCL Technologies Ltd.

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ABOUT THE FOUNDER

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