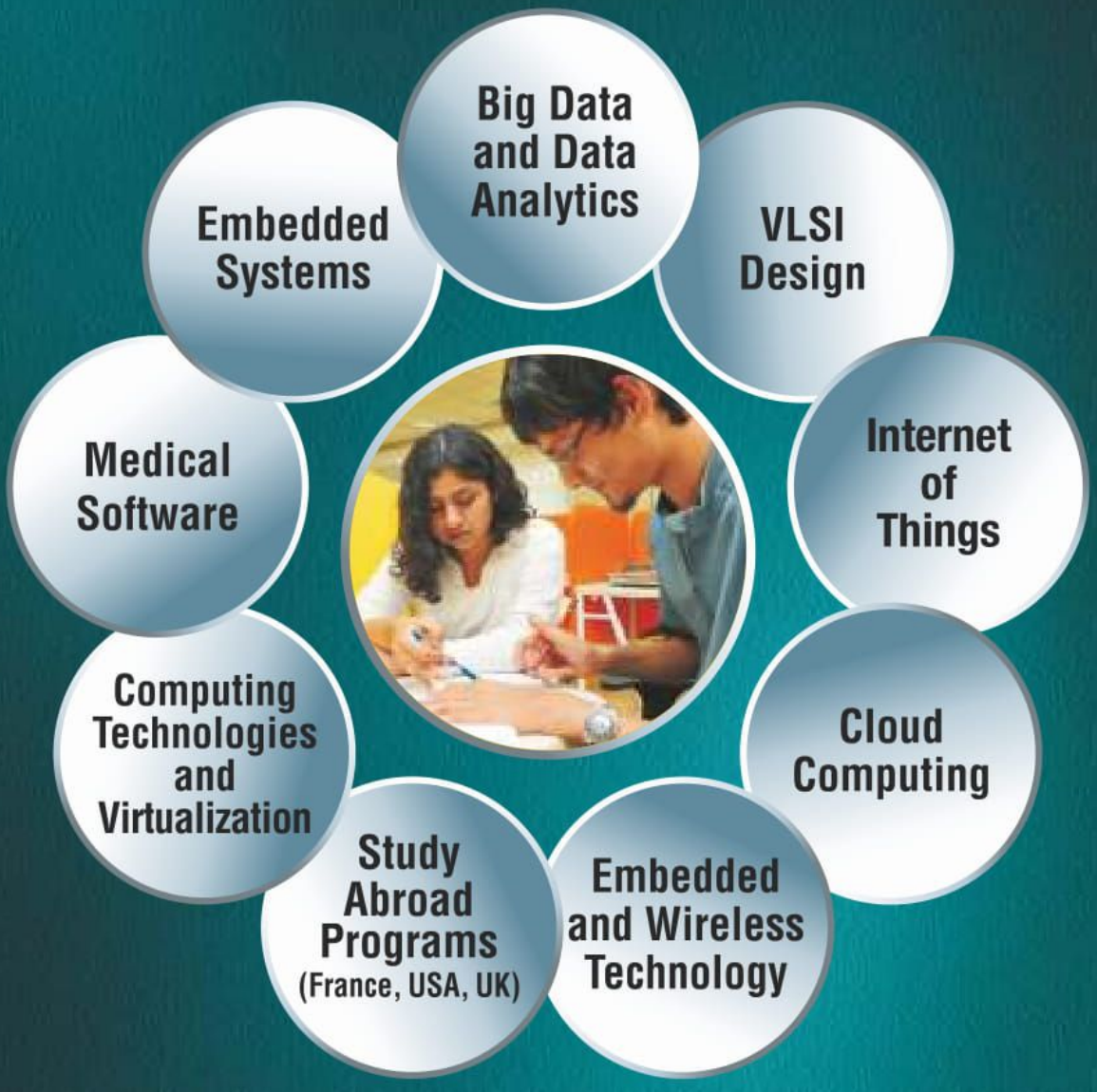
SCHOOL OF INFORMATION SCIENCES
MANIPAL
(A constituent unit of MAHE, Manipal)

MANIPAL 25 1993-2018

Master of Engineering (ME) Programs



Program Highlights

- Curriculum that encourages learning-by-doing
- Merit scholarships for eligible students
- Term projects driven by industry requirements
- Access to modern laboratory facilities
- Excellent placement support for internships
- Experienced faculty
- State-of-the-art teaching facilities
- Opportunity to study abroad
- Access to Labs beyond working hours
- Opportunity to work on Philips "Health Suite Insights" platform

School of Information Sciences
http://www.manipal.edu/sois

Information Brochure

About the Institute

School of Information Sciences (SOIS) was constituted in 1998 under MAHE, Manipal. It is an ISO 9001:2015 and ISO 14001:2015 certified institute.

The vision is to be the center of excellence in interdisciplinary education including Medical Software, Embedded Systems, VLSI Design, Cloud Computing, Big Data and Data Analytics.

Over the past twenty years, SOIS has grown from strength to strength expanding its programs and improving its research capabilities. It now boasts of seven ME programs and study abroad programs.

Advantages of Studying at SOIS

- Experienced faculty. Frequent tech-talks and invited lectures by experts from industry and academia.
- Regular curriculum enhancements in consultation with practitioners and subject experts.
- Faithful adherence to learning-by-doing discipline. Every subject has a laboratory component.
- Provision to work on term projects defined by industry requirements.
- Complete support for securing two-semester internship in more than 60 leading industries.
- The Center for Software Development (CSD) is a facility within SOIS that designs and develops software solutions for MAHE. Students may apply for internships in CSD and learn to develop real solutions using Microsoft DotNet, J2EE as well as Android technologies.
- Medical Imaging Research Suite (MIRS) offers a great platform for students to work with faculty and researchers investigating new protocols for musculoskeletal imaging. There are opportunities to carry out research, add to IP portfolio of the institute.
- Great opportunities to study abroad with partner university in France, USA & UK.
- Facilitated to learn through MOOCS, Coursera

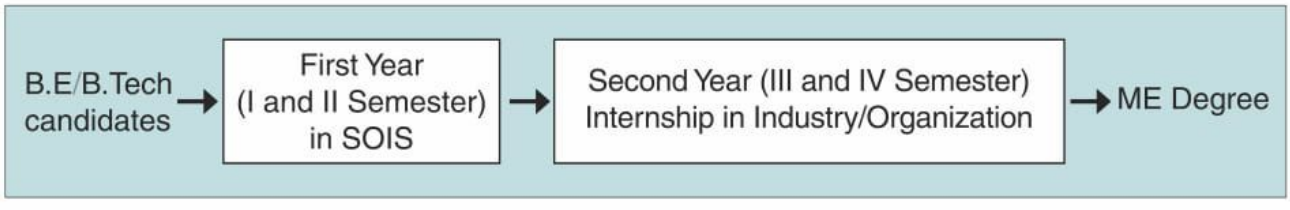
ME Program Structure

The University Grants Commission (UGC) has normatively approved the nomenclature "Master of Engineering (ME)", for a postgraduate engineering program.

The duration of this course is two years, spanning four semesters. The course is structured as follows:

Semester 1 and Semester 2 - course work in SOIS, Manipal.

Semester 3 and Semester 4 - internship in an engineering organization, which includes relevant industries, research labs and distinguished academic institutes.



ME Program Admission Eligibility

The candidates seeking admission to ME programs must have qualified in one of the following undergraduate courses from a recognized university, securing at least 50% aggregate marks:

BE/B.Tech or equivalent degree in Electronics and Communication, Computer Science, Information Science, Electrical and Electronics, Telecommunication, Bio-medical Engineering, Medical Electronics, Mechatronics, or Instrumentation Engineering or equivalent.

Msc Mathematics and MSc Statistics graduates are eligible to seek admission in Big Data and Data Analytics program.

Candidates with M.Sc. degree in Computer Science or Information Science with a minimum of 50% aggregate marks in the qualifying examination are also eligible to seek admission in Cloud Computing.

Fee Structure

	Refundable Caution Deposit	Course Fee	Total Fee
1st year	₹ 10,000	₹ 1,90,000	₹ 2,00,000
2nd year		₹ 1,90,000	₹ 1,90,000
			₹ 3,90,000

Scholarships for SOIS Students

- Since 2010, SOIS has been awarding scholarships for every ME program. The top ten percent of students will be eligible. 50% of their tuition fee will be waived-off for meritorious students.
  - So far 185 students have received this scholarship.
  - The scholarship will be continued during second year if the candidate satisfies the condition of scoring minimum of 8 CGPA in the first year.
  - This scholarship is offered, if the program has minimum of 20 students.
- Scholarships for Academy of General Education Students (SAGES).
- Konkani scholarship.

Laboratories in SOIS

- Each discipline hosts a dedicated, well-equipped laboratory. Students can avail the facilities available in these labs from 8 am to 8 pm, everyday of the year. Each lab is also furnished with modern teaching aids including ceiling mounted projectors and whiteboards.
- Every workstation has round the clock access to high-speed Internet. SOIS boasts of sophisticated software for VLSI design from Cadence and Xilinx. In addition, students get access to Matlab, Labview, Qualnet, Keil and TI Code Composer.
- Labs have more than 100 kits that include advanced microcontrollers, ARM Cortex processors, Arduinos and Raspberry Pis.
- Imaging Lab
- Philips supported Data Science Lab

Achievements and Recognitions

- CAMTech Innovation Award, 2015.

  US$50000 for a project that aims to develop highly effective cervical cancer screening solution in resource-poor settings.
- Infineon Technologies Technical Paper Contest, 2014.

  Out of 80 submissions in total from all over India, two papers from SOIS won two prizes.

  First position: Paper titled "Intelligent Vehicle using Electric IMP" by Ms. Anjana Joshi, Ms. Ankitha K. A., and Ms. Manasa B. N. These students represented the Embedded Systems program. Cash award of ₹ 40000.

  Second position: This paper focused on low power consumption. Authors: Ms. Dhanya Hegde and Mr. Pradeep V. These students represented the VLSI program. Cash award of ₹ 30000.
- Indian Electronics and Semiconductor Association (IESA) Super Project contest, 2014.

  Award of ₹ 50000 for a project titled "Tracking Controller for the Parabolic Reflector with Static Focus". This project was carried out at World Renewal Spiritual Trust, Bangalore. This tracking system is installed at the Mount Abu solar plant managed by World Renewal Spiritual Trust.
- ₹ 1,00,000 from Mirafra for training their new engineers.

Quotes from alumni

"The excellence of our faculty, the strength of our course curriculum, and the commitment towards quality education has placed MAHE at the forefront in field of higher education. I continue to believe that my time at the MAHE as a student shaped my life in many immeasurably positive ways. I wholeheartedly endorse SOIS, Manipal for everything which it stands and look forward to have continual association with this esteemed education institution."

Sharat Kalyan

Designation: Technical Lead, Samsung Research Institute, Bangalore

Quotes from alumni

"The year I spent at SOIS, Manipal was the best year of my academic life. Learnt a lot from each of the subjects we had in the course. The curriculum set at college was very competitive and industry focused; we had technologies like 'Android' (Operating system + Application design), which I have not come across being taught any-where else. During the course of my study we were encouraged to do multiple projects and deliver technical topics. Looking back to the time I had to choose between Infosys and Manipal, I feel that it is the single most important decision of my life to have chosen MAHE, Manipal ".

Ganesh Kamath

Designation: Software Engineer, Intel, Bangalore

Placement Advantage with SOIS

- SOIS students were selected for Internship with a stipend ranging from ₹15,000 to ₹ 45,000 per month.
- More than 90% of students get selected for internships through institute placement cell.
- About 85% of the interns are hired for engineering positions in the respective industry after internship.
- SOIS has signed MoU with Manipal Dot Net (MDN), Applied Cognition Systems (APCOGS), Philips, and Mirafra Technologies for the student internships.
- SOIS has in house software development unit, Centre for Software Development (CSD) and MIRS where students have opportunity to carry out projects.

Study Abroad Programs with France, USA, UK and Belgium

For Study Abroad Programs with ESIGELEC, France - Students will study one semester in MAHE, Manipal and continue their second semester in ESIGELEC, France. Second year of internship can be done in any country.

For Study Abroad Programs with Virginia Commonwealth University, USA, Lancaster University, Edinburgh Napier University, UK and GroupT, Belgium - Students will study one year in MAHE, Manipal and continue their second year in respective University.

For more information please refer: http://www.manipal.edu/sois.

Engineering Companies that offered student internships in 2018

AIM	CSD	GE	Meddiff	Nvidia	Ricoh	Synopsys
Arm	Data Team	Infineon	Media Tek	NXP Semiconductor	Samsung	VmWare
Arraystorm	Delphi	Intel	Microchip	Oracle	Sandisk	Volmo
Atonarp	DSP Group	KPIT	Microsemi	Philips Lighting	Schneider	Wellthy
Avin Systems	Ericsson	Mathworks	Mirafra	Philips	Siemens	Whizchip
Beckman Coulter	Freescale	Marvel	Nokia	Rambus	ST	Xilinx
Bosch						

ME (Cloud Computing)

Objectives of this program is to provide hands on experience to work, manage and deployment of cloud infrastructure based on best practices and protocols, understanding security issues in cloud, handling of Big data on cloud and to provide end to end cloud business solutions.

Program Outcomes are:

Foundational IT courses included to learn the basic skillsets required for any IT industry domain. Program covers Cloud architecture, Virtualization techniques, Cloud security and Networks which will lay good platform for Cloud engineers. Cloud based application development is included in the program to meet the requirements of application development for web / Internet which is an emerging technology.

Big data is a trending technology and majority of Big Data applications are cloud based. So Big data analytics, Visualization and Machine learning are also part of the curriculum.

Imparting skills for engineers to be street smart and motivate them to be Entrepreneurs to start a Cloud Enterprises.

First Semester	Second Semester
• Data Structures and Algorithms • Real Time Operating Systems • Cloud Architecture and Management • Cloud Application Development with Java	• Cloud Networks • Cloud Security • Cloud Database Management • Big Data and Data Visualization
Elective I	Elective II
• Client Side Internet Technology • DevOps for Cloud • Fundamentals of Machine Learning	• Server Side Internet Technology • Data Ware Housing & Data Mining • Machine Learning for Big Data

ME (Internet of Things)

Program Objective

- To train engineers to develop, deploy and manage IoT Applications based on current standards, protocols and best practices.
- To understand the infrastructure, security issues and handling IoT devices.
- To provide end-end IoT solutions.

Program Overview

An engineering graduate skillset requirement is changing with invent of the new technologies. In particular the impact of Big data and its transformative technologies like Internet of Things (IoT) provide a high employability in the industry. IoT will become the mainstream phenomenon by 2020. IoT is a large scale implementation technology which is embodied in a wide spectrum of networked products, systems, and sensors, which take advantage of advancements in computing power, electronics miniaturization, and network interconnections to offer new capabilities which was not previously possible.

The program ME (IoT) helps engineering graduates to specialize in the field of IoT and enables them to learn how IoT devices can be programmed and networked for the data communication and its analysis. Students will also understand the security issues, IoT protocols and the network stack of IoT. This program will pave path for the engineers to work as an IoT Architect, IoT Security Analyst, IoT application Developer and IoT Stack developer.

First Semester	Second Semester
• Data Structures and Algorithms • Operating Systems for IoT • IoT Networks and Protocols • IoT Security	• Embedded Sensing Systems and Networks • Embedded Systems • Responsive Web Application Development • Big Data and Data Visualization

Elective 1	Elective 2
• IoT Application Development • Cloud Application Development with JAVA • Fundamentals of Machine Learning • Digital Signal Processing	• Device Drivers • Mobile Application Development using Android • Machine Learning for BigData • Entrepreneurship

ME (Big Data and Data Analytics)

This program started in the year 2016. Big Data and Data Analytics are playing an important role in business, government, healthcare and education. Big Data technologies provide efficient solutions for acquiring and processing large scale data. Data Analytics combines principles and techniques from mathematics, computer science and machine learning for offering predictive and prescriptive solutions.

This program offers a balanced introduction to foundational topics and practices in Big Data and Data Analytics.

First Semester	Second Semester
• Algorithms and Data Structures for Big Data • Large Scale Distributed Computing Systems • Probability and Statistical Inferences • Fundamentals of Machine Learning • Elective - 1	• Machine Learning for Big Data • Architecture of Big Data Systems • Multiple Linear Regression and Logistic Regression • Healthcare Informatics • Elective - 2
Elective-1	Elective-2
• Mobile Web Application Development • Principles of Data Visualization	• Text Retrieval and Search Engines • Applied Multivariate Analysis

ME (Embedded Systems)

This program started in the year 2002. The Embedded Systems program balances between the treatment of high-level systems design and the engineering of subsystem components.

The topics covered in the courses range from the engineering design of reactive systems to the implementation of software components that drive hardware elements. One set of courses relate to the central ideas of systems development: Linux device drivers, computer architecture, micro-controllers, and the general ideas of embedded systems design. The other set of courses include the study of principles of real-time operating systems, design of data structures and algorithms, and digital signal processing. Students may choose to learn mobile application development or internet of Things from a bunch of elective subjects

First Semester	Second Semester
• Data Structures and Algorithms • Real Time Operating Systems • Advanced Computer Architecture • Microcontrollers and Applications • Elective - 1	• Digital Signal Processing • Device Drivers • Embedded Systems • Embedded Software Design • Elective - 2
Elective-1	Elective-2
• Internet of Things • Computer Networks • Database Programming in Java	• Multicore Program Optimization • High Level Digital Design • Mobile Application Development using Android

ME (VLSI Design)

This program started in the year 1999, includes rich elements of classical and modern VLSI design practices.

The program covers a breadth of topics. Courses deal with hardware description languages, simulation techniques, hardware verification methods, foundations of low power design, and Universal Verification Methodology (UVM). Students also get to use Python, perl and shell scripting technologies to learn the best practices of design workflow automation. Elective courses let students choose between System on Chip (SoC) design and Digital Signal Processing. Depending on one's interests, a student may learn either advanced logic synthesis or physical design (back-end).

The VLSI lab of SOIS equipped with latest versions of software from Cadence and Xilinx.

First Semester	Second Semester
• Data Structures • High Level Digital Design • Digital Systems and VLSI Design • Verification • Elective - 1	• Advanced VLSI Design • Low Power VLSI Design • Universal Verification Methodology • Scripting for VLSI • Elective - 2
Elective-1	Elective-2
• System on Chip Design • Digital Signal Processing • CAD for VLSI	• Physical Design • Advanced Logic Synthesis • Formal Methods

ME (Medical Software)

This program started in the year 1998. Medical device manufacturers require embedded software solutions to be efficient and correct by design. CT scanners and MRI devices, for example, need to process large volumes of 3D image data in real time. Efficient algorithms for data storage as well as data processing are crucial. Since medical images communicate critical data about human health conditions, it is important that image processing solutions produce accurate results. All these requirements put immense demands on engineering processes and skills.

The Medical Software program was initiated in 1998 jointly by MAHE, Manipal and GE Healthcare. The vision was to impart engineering skills required to develop solutions meeting the critical requirements of healthcare industry.

First Semester	Second Semester
• Data Structures and Algorithms • Software Engineering • Computer Networks • Medical Imaging • Database Programming in Java	• Advanced Image Processing • Interoperability Standards in Healthcare • Mobile Application Development using Android • Elective-1 • Elective-2
Elective-1	Elective-2
• Computer Graphics • Bio Medical Signal Processing • Data Mining	• Web Application Development • Real Time Operating Systems • Dot Net Technologies

ME (Embedded and Wireless Technology)

This program started in the year 2010. Evolution of future generation wireless networks mandates students to have a good understanding of their underlying theories and practical. The curriculum comprises of deep insight into new methods of mobile application development, porting operating systems to different targets and applications development of embedded systems, wireless communication, sensor networks and signal processing and integrated systems.

First Semester	Second Semester
• Data Structures and Algorithms • Real Time Operating Systems • Android Programming using Java • Advanced Network Protocols • Elective - 1	• Mobile Application Development • Cryptography and Network Security • IoT Architecture and Networking • Wireless Embedded Systems • Elective - 2
Elective-1	Elective-2
• Embedded Linux • Microcontrollers and Applications • Advanced Computer Architecture	• Web Application Development • Heterogeneous Computing • Embedded Systems

ME (Computing Technologies and Virtualization)

This program started in the year 2011. Computing Technologies and Virtualization make it possible to design solutions using a balanced mix of CPUs and GPUs. Our program recognizes this synergistic connection between virtualization and heterogeneous computing.

The courses explore how virtualization in conjunction with newer computing models provide efficient solutions to complex problems. Students study computer architectures, models of heterogeneous computing, models of virtualization, and the operating system level support for resource virtualization. The CUDA programming model is used to demonstrate important aspects of heterogeneous computing.

First Semester	Second Semester
• Data Structures & Algorithms • Real Time Operating Systems • Virtualization Techniques • Android Programming with Java • Elective - 1	• Cloud Computing • Storage Area Networks • Heterogeneous Computing • Big Data and Data Visualization • Elective - 2
Elective-1	Elective-2
• Embedded Linux • Multicore Program Optimization	• Web Application Development • Cryptography and Network Security

For further information contact

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