Interdisciplinary School of Scientific Computing
Yearly Brochure of ISSC
Placement and Industrial Training
IT & Placement
FOREWORD

It gives me immense pleasure to introduce the students of Interdisciplinary School of Scientific Computing (ISSC) for their Industrial Training and Placement Program. M. Sc. (Scientific Computing).

Students undergo full time industrial training during fourth semester. This batch will go for training from January 2016 to June 2016.

The uniqueness of the syllabus makes our students well versed with the core concepts of computing as well as gives them an exposure to the current technologies. Given an opportunity, they will prove themselves to be assets to your organization.

Looking forward for a favorable interaction.

PROF. Anjali Kshirsagar
Director, ISSC

INTRODUCTION

There is now hardly an area of science or engineering that does not use computers for modeling. Problems in these areas reduce to systems of differential or linear equations. These systems are then solved using numerical techniques, which are more dependent on the system than the domain of the problem, but these systems come in all sizes and shapes. Solving them stretches the available computer resources to their limits. Solution Viz. strange arrays of number cannot be understood unless proper visualization techniques are used. Data mining is necessary to use information from large Chemical or Biological databases. All this has led to development of Scientific Computing as a discipline in its own right. It draws on domain knowledge from Sciences and Engineering and technology from Computer Science to develop the best way to solve these problems.

Interdisciplinary School of Scientific Computing was founded in 1994 to address the need of training and research in the field of Scientific Computing. It is a unique school of its kind in the country and one of the few schools in the world. The M.Sc. (Scientific Computing) [formerly known as M.C.S (with specialization in Scientific Computing)] program attempts to strike a balance between training in sciences and computer science. It emphasizes on the fundamentals of a subject and helps in absorbing specific technologies when required. The School also offers M.Phil. and Ph.D. programs.
COURSE STRUCTURE

We have structured the course in such a way that it course all core concept of scientific computing as well Modern Technologies

IN-HOUSE FACULTIES

The Department is noted for its distinguished faculty who has made it a place for excellent teaching. The breadth of faculty expertise is evident from the variety of courses offered and the innovative ways of assessment.

• PROF. ANJALI KSHIRSAGAR (DIRECTOR)
  An extremely accomplished Physicist and a Gold Medalist from Devi Ahilya University, Indore. She completed her PH.D as well as M.Sc in Physics from SPPU and her specialization is Computational Condensed Matter Physics.

• DR. SMITA BEDEKAR (ASSOCIATE PROFESSOR)
  A PH.D from IIT Kanpur with Research on Parallel Algorithms for partial differential equations. She has been working with ISSC for past seventeen years.

• DR. VAISHALI SHAH (ASSISTANT PROFESSOR)
  A PH.D in Physics from SPPU. Worked as Lecturer with Institute of Biotechnology, SPPU.

• MRS. SHUBHANGI KOHADKAR (JUNIOR FELLOW)
  M.Sc scientific computing from ISSC, SPPU.

VISITING FACULTIES

• MR. UMA MAHESHWAR V.
  EX-VICE PRESIDENT AND LOCATION HEAD OF PATNI COMPUTER SYSTEMS LTD (NOW IGate), PUNE

• MR. ABDULLAH ANSARI
  PROJECT ASSISTANT

• MRS. KAVITA AHIRE
  EX-FACULTY FROM PUCSD

• MRS. APARNA ATHAVALE
  FACULTY FROM CUMMINS

• MR. M. K. TANDON
  WORKING WITH INDIAN INSTITUTE OF TROPICAL METEOROLOGY, IMD, PUNE

• MRS. PRABHA INAMDAR
  CONSULTANT , EX-PSPL EMPLOYEE

• MRS. SAVITA PUNDALIK
  EX-TCS EMPLOYEE

SEMESTER I

1. Principles of Programming Languages I
   1) Introduction
   2) Elements of Programming
   3) Programming Paradigms
   4) Graph Theory, Data Structures, Sorting and Searching Algorithms
   5) Design and Analysis of Algorithms
   6) NP-Completeness

2. Software Engineering
   1) Introduction
   2) Software engineering
   3) The Software Development Process
   4) Software Testing
   5) Software Construction and Implementation
   6) Advance topics (like- Agile Methodologies, Scrum etc.)

3. Advanced Database Management Concepts
   1) Review of DBMS Concepts
   2) Security in DBMS: Authorization Matrix, Encryption
   3) Reliability of DBMS
   4) Distributed Databases
   5) Parallel Databases
   6) Data Warehouse and Data Mining

4. Mathematics For Scientific Computing
   1) Functions, Limits, Continuity
   2) Differentiation & Integration Linear Algebra
   3) Matrices
   4) Vectors
   5) Fourier Series
   6) Power Series
   7) Ordinary Differential Equations
   8) Partial Derivatives

5. Computational Laboratory I
   [Projects on current technology.]
SEMESTER II

1. Principles of Programming Languages II
   1) C++
   2) LISP
   3) Prolog

2. Operating System Concepts
   1) History
   2) Process Scheduling
   3) File Systems
   4) Kernel Algorithms
   5) Shell Concepts
   6) Internal representations of Files
   7) Inter-process communication
   8) Memory Management

3. Applications of Computer to Physics (Elective)
   1) Modeling and Simulations in Physics
   2) Monte Carlo methods
   3) Percolation, Fractals, Kinetic Growth Models and Cellular Automata:
   4) Classical molecular dynamic

   1) Linear and Nonlinear equations.
   2) Curve Fitting & Polynomial Approximation
   3) Numerical Differentiation & Integration
   4) Eigen value & Eigenvector

5. Computational Laboratory II
   [Projects on current technology.]

SEMESTER III

1. Network Concepts
   1) Data Communication
   2) Transport and Session Protocols
   3) Internetworking
   4) Presentation Layer
   5) Application Layer

2. Scientific Visualization
   1) Introduction
   2) Raster Graphics Techniques
   3) Uses of Vectors in Graphics
   4) Picture Transformation
   5) 3-D Viewing
   6) Frame Models
   7) Shedding & Rendering
   8) Ray Tracing
   9) Multimedia & Animation

3. Parallel Computing and Grid Computing
   1) Introduction
   2) Solving problem in parallel
   3) Structure of parallel computers
   4) Programming in parallel computers
   5) Case Studies
   6) Grid Computing

   1) Ordinary and Partial Differential Equation
   2) Linear Optimization
   3) Non Linear Optimization
   [Transport Problem, Simplex Method]
   4) Golden Search Method, Brent’s Procedure

5. Computer Applications in Physics
   1) Monte Carlo Methods
   2) Numerical Solutions of Schrodinger equations
   3) Electronic Structure
   4) Calculation on simple solids
   5) classical Molecular Dynamics

SEMESTER IV

Students undergo full time Industrial Training or R&D.
At the end of the semester they are evaluated on the basis of project they complete as a part of their training.

PROJECTS UNDERTAKEN

TraAs [Traffic Route Analyzer for Ambulance Service]
The project is based on the idea of overcoming the problems faced by ambulance drivers having lack of route knowledge or problems with traffic congestion. TraAs helps to guide the user with a shortest route by analyzing the traffic dynamically.

ISP [Intelligent Service Provider]
This project is an extension to the modern service selling application. ISP is a handy application that lets you buy or sell services with a direct communication with the user or provider respectively with an automated efficiency of rating based search along with robustness of the system by using backup servers implementation.

Color To Audio.
Color to audio is a mobile application designed for color blind people and painters. Using this application the name of the dominant color can be extracted from an image in Hindi, Marathi or English, just by capturing the image. The image is processed by using a Color Thief library which generates frequency of colors in the image and returns the dominant color.

Krishi Balance Center(KBC).
Krishi balance center is an application designed explicitly for farmers and brokers. Using this application the farmers can view the current rates for commodities of any market as well as enter his/her rate for the commodity that he/she is providing.

Stock Taker
Stock taker is a client-server based application that analyzes the stock discrepancy by counting the stock with the help of android mobiles. It also provides features to check list of ongoing basis and send notifications to the clients whenever required.
Breathing Walls
This project is an application used to assist the Interior Decoration Firm, using which the user can create his/her blue print designs for a grid of fixed size. This system also provides a list of pre-defined templates and toolbox objects that can be directly placed on the grid by simply dragging and dropping the objects into the grid.

Online Interview Guide
It is online website for students to prepare for interviews from practice tests and expert guidance by directly chatting with experts. Students will get suggestions of books as per their test performance.

Multi-Utility Pass System
It is an online system that automates the pass system for users, travelling by bus, train or metro. It provides facilities for pass validation and pass expiry notification. Active pass utilization reports and numbers of users using the system are also maintained.

NetSpider (Proxy Server)
An application used to track users based on IP address. The server has features to block/unblock websites and report the IP's trying to access the blocked websites.

Star Gaze
An application used to plot the actual shape of an asteroid using the provided Lat/Lng coordinates and the occultation list. The system also has facilities to enter favorite location and update the databases with it.

Rajnikant Search: The Search Engine.
The Crawler based search engine, which crawls the links & links the text from the website & saves it in the database. On searching with some keyword/query, the retriever matches the keyword with the link text previously saved in the database & returns the corresponding links with link texts.

Delivery Route Planner: Route Guide for delivery Boys
Route guide for delivery boys - The Client-Server Based application, where server maintains the information & schedule of delivery boys & the package allocation. The Server checks for the addresses of parcels given to each delivery boy and generates a shortest path to reach his all destinations & back to warehouse.

Regalo
Website for Suggesting Gifts to Family Members, Friends along with a reminder facility for notifying important dates to registered users.

Sentiment Analysis
Sentiment Analysis also called as opinion mining is the analysis of opinions. This application deals with movie reviews. The reviews are analyzed as positive or negative depending on its probability. A statistical approach is used in this application with the help of a Naïve Bayes classifier to get an accuracy of 85%.

Railway Level Crossing Alert
An automation to the security at railway crossing gate by providing a notification from train to its nearest crossing gate when train reaches a minimum distance from gate. This notification will remind gate keeper to close the crossing gate in minimum time and send feedback to the train, so that train can safely pass the railway crossing gate.

Mega Complex Security Control
This server-client application is used for providing maintenance services to society residents. Using which they can issue request for a service via mobile. This message will go to the registered service providers, they will accept it and when they arrive to solve the issue, they will undergo face recognition for better security purposes.

Ghajini (Face recognition on android)
This android application for face recognition is used by prosopagnosic, early stage dementic patients. The details of relatives of patients are maintained in system and these details are verified using this application to recognize relatives. Notification is provided if the details of relatives are not matched.

Travel Leinguist
This Android Application is used for translating text/data from one language to another. Using application photo of text which is to be converted into another language is captured and using OCR, editable text is obtained from photo. This editable text is converted into another language using Dictionary.

Health Watch
This Android Application is used to monitor health of its user. Using this application, Status and Graph is generated from reports of blood test conducted in regular time periods which is maintained in the system. Graph is also generated for FATS and BMI.

TECHNOLOGIES:

- PLATFORM: JAVA, ANDROID
- SCRIPTING LANGUAGE: SERVLET, JSP & PHP
- DATABASE: MYSQL
- WEB-SERVICE: JSON - RPC
- MAPS API: GOOGLE MAPS (V2)
Thanking You

I thank you for sparing your valuable time. We hope for a positive reply. Awaiting your favorable response.

Prof. Anjali Kshirsagar
Director,
Interdisciplinary School of Scientific Computing,
PO Box #27, University of Pune, Ganeshkhind,
Pune-411007
Website: http://issc.unipune.ac.in
Phone: 020-25691978/25601156
Extn: 23, 26
Email: placement@issc.unipune.ac.in
scicomp@unipune.ac.in

Placement Coordinators [Student]

Vineet More
Email: vineet.more.official@gmail.com
Contact: 7276267511

Arpita Trivedi
Email: arpita_trivedi@hotmail.com
Contact: 9970012024

Placement Coordinators [Faculty]

Dr. Smita Bedekar
Email: smitab@unipune.ac.in
Contact No.: 020-25691978/25601156
Extn: 23

Mrs. Shubhangi Kohadkar
Email: kshubhangi@issc.unipune.ac.in
Contact No.: 020-25691978/25601156
Extn: 26