



M.Tech. Computational Science Admissions Brochure, 2016

About the M.Tech. Computational Science Program

Computational Science is an inter-disciplinary area that brings together the domain-specific knowledge of science and engineering with relevant areas of computing and mathematics. It educates and trains students to 'model' problems or 'simulate' processes varying across many disciplines in science and engineering.

The M.Tech. program in Computational Science offered by the Department of Computational & Data Sciences (CDS) starts in August and spans 2 years (4 semesters). In the first year, students are exposed to fundamental concepts of Computational Science such as data structures and programming, modelling and simulation, mathematical and computational tools. The second year offers students several fields of specialization through elective courses. The program culminates with a computational science dissertation project in their second year.

The M.Tech. Admission process

Candidates applying to the M.Tech. Computational Science program will be notified if they are short-listed for the interview. The interview process will begin with a short **Written Test** on the morning of the first day of the interview (Mon April 18, 2016). Applicants who clear the Written Test will be called for an **Oral Interview**, which will be held on the next day (Tue April 19, 2016).

1) The **Written Test** has questions on Basic Mathematics and Programming. The mathematics part includes topics from undergraduate and high school mathematics such as algebra, geometry, linear algebra, calculus, probability and statistics. The programming part includes topics such as simple concepts in algorithms, and a working knowledge of programming. The duration of the Written Test will be between 30-40 minutes (and don't forget to have a pen, a pencil and an eraser with you).

2) Candidates cleared for the **Oral Interview** will be asked to choose two areas, *one* in a Background Area and another *one* in Mathematical Preliminaries, with topics as listed below. Their proficiency in these areas will be tested. Candidates will also be questioned on their previous project(s) and academic background. Besides these, the candidate will also be tested on their programming skills. The typical duration of the Oral Interview is 20 minutes.

NOTE: A candidate with a degree in Mathematics is allowed to choose both areas from mathematical preliminaries if so desired.

Background Areas: These are at the level of courses in engineering and science areas in which the candidate may have done his/her B.Tech./M.Sc. studies.

Examples of Background Areas: Data structures, design of algorithms, signal processing, mechanics, electrostatics, electrical circuits, heat/mass transfer, fluid mechanics, proteomics.

Mathematical Preliminaries: Discrete mathematics, linear algebra (including matrix algebra), functional analysis, probability, statistics, differential equations and numerical methods.

Computer Programming: Programming (with high level languages such as C/Fortran and/or C++/Java) concepts and algorithm implementation concepts.

Example: A candidate with a Mechanical Engineering background may choose “fluid mechanics” as a Background Area and “differential equations” as the Mathematical Preliminary area. Basic computer programming skills are required of all candidates.