

Theory of Computation (CS340)

Semester I, 2019-20

July 28, 2019

Course Logistics

- Instructor:
Raghunath Tewari
Room No. 514 RM Building
email: rtewari@cse.iitk.ac.in
- Venue: RM101
- Class Time: Mon and Fri: 8:00am – 9:00am, Tue: 9:00am – 10:00am
- Course Textbook: *Introduction to the Theory of Computation*, by Michael Sipser.
- Office Hours: Monday 9:00am – 10:00am
- Teaching Assistants:
 - Chetan Gupta (gchetan@cse.iitk.ac.in)
 - Vimal Raj Sharma (vimalraj@cse.iitk.ac.in)
 - Rahul Jain (jain@cse.iitk.ac.in)
 - Snehanshu Vivek (svivek@cse.iitk.ac.in)
 - Sujit Kumar Muduli (smuduli@cse.iitk.ac.in)

Course Syllabus

- Models of computation – classification, properties and equivalences.
- Regular languages models: finite state machines (deterministic and non-deterministic), regular grammars, regular expressions, equivalence of deterministic and non-deterministic machines and of the three models. Properties: closure, decidability, minimality of automata, iteration theorems.
- Context-free languages models: grammars (including different normal forms), pushdown automata, and their equivalence. Properties: closure, iteration theorems, parsing.
- Recursive and recursively enumerable sets models: Turing machines, grammars, recursive functions, their equivalence. Church's thesis. Properties: closure, decidability, undecidability/non-computability, notion of reductions.

Testing and Grading

Your grades will be based on class participation, homework assignments, quizzes, a mid semester exam and a final exam. The following table gives a guideline for evaluating your final grade.

Course Component	Weightage
Homeworks	15%
Quizzes	20%
Mid Semester Exam	20%
Final Exam	45%

Other Information

- All course information will be conveyed via the course mailing list.
- There will be 4 homework assignments distributed over the semester. You will be given about one week to complete each assignment. The assignment will be due at the beginning of class on the respective day. Late submissions are strongly discouraged and will be penalised.
- There will be around 4 quizzes in this course. The quizzes may be unannounced.
- Plagiarism in any form such as cheating, copying, lending your work to others, etc., is very strongly discouraged and will be heavily penalised.
- For the midterm and final exams you can one handwritten carry A4 sheet of paper with whatever content that you would like to include in it (front and back). Your name and roll number must clearly be mentioned on the sheet and the sheet will be collected at the end of the exam together with your answer booklet.
- There will be NO makeup quizzes/exams unless under extreme circumstances, which is solely upon the discretion of the instructor.
- Clarity and legibility of your solutions are as important as the solution itself.
- It is strongly encouraged that you attend all lectures.