1 Course Overview

1.1 Syllabus

The subject - theory of computation, comprises the fundamental mathematical properties of computer hardware, software, and certain applications thereof. In studying this subject, we seek to determine what can and cannot be computed, how quickly, with how much memory, and on which type of computational model; to see a new, simpler, and more elegant side of computers, which we normally consider to be complicated machines; to learn conceptual tools that practitioner use in computer engineering. The main topics/subtopics covered will be:

- Automata and Languages
  - Regular Languages: Finite Automata, Non-determinism, Regular expressions, Non-regular languages
  - Context Free Languages: Context free grammar, Push down automata, Non-context-free languages, Deterministic context-free languages
- Computability Theory
  - Turning Machines, Variants of Turning Machines, The definition of algorithm
  - Decidability: Decidable Language, Undecidability
  - Reducibility
- Complexity Theory
  - Time Complexity: Complexity Classes - P, NP
  - NP Hard, NP Completeness
  - NP Complete Problems
  - Intractability

1.2 Grading Rubric

Your final grade in the course will be calculated as per the policy given in Table 1.

Evaluation Type	Weightage		Letter Grade	Percentage Bracket
Mid Term	20%		F	< 40
Assignments [1]	60%		D-	$40 - 44$
Final Term	20%		D	$45 - 49$
			D+	$50 - 54$
			C-	$55 - 59$
			C	$60 - 64$
			C+	$65 - 69$
			B-	$70 - 74$
			B	$75 - 79$
			B+	$80 - 84$
			A-	$85 - 90$
			A	> 90

Table 1: Grading Policy

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[1] "Assignments" - will include all or some of the following: theory/programming home work, in-class quizzes, weekly in-class tests and course project.

1.3   Weekly Teaching Hours

Beside two 90-minute weekly lectures, the course will have a mandatory 60-minute session per week. A regular 60-minute slot will be decided in the first week of the course. This session will be used primarily to hold weekly test and to enforce concepts and techniques learned in class.

1.4   References

- Lecture Slides

- Introduction to the Theory of Computation, 3rd edition. Michael Sipser. CENGAGE Learning. It is expected that you have a copy of your own.

1.5   Late Homework Policy

Late or improperly submitted homework will not be accepted. If you know in advance that you will be unable to submit your homework at the correct time, you must make special arrangements ahead of time. Theory assignments must be written neatly and well organized. If it's not readable, it won't be graded. You should strongly consider starting with a rough draft, especially on problems requiring a proof. You might consider taking the opportunity to learn LATEX.

1.6   Academic Dishonesty

Many students find it helpful to consult their peers while doing assignments. This practice is legitimate and to be expected. However, it is not acceptable practice to pool thoughts and produce common answers. To avoid this situation, it is suggested that students not write anything down during such talks, but keep mental notes for later development of their own. Students who allow their files or assignments to be copied are as guilty of academic dishonesty as those who copy and will be treated accordingly. Major occurrences of academic dishonesty, such as the submission of work that is not the student's own, will be dealt with according to the Ashoka University's academic honesty document.