COURSE DESCRIPTION FORM

INSTITUTION Department of Computer Science & IT, University Of Sargodha

PROGRAM (S) TO BE EVALUATED BSCS, 5th Regular & Self

A. Course Description

(Fill out the following table for each course in your computer science curriculum. A filled out form should not be more than 2-3 pages.)

Course Code	CS-3131
Course Title	Theory of Automata and Formal Languages
Credit Hours	3 CR
Prerequisites by Course(s) and Topics	CMP-2111 (Discrete Structures)
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	Quizzes: 10 %, Homework: 10% Midterm: 30%, Final Term: 50 %
Course Coordinator	Dr. Qaiser Abbas
URL (if any)	www.clsp.org/qabbas
Current Catalog Description	Not Available as per curriculum
Textbook (or **Laboratory Manual** for Laboratory Courses)	Introduction to Automata Theory, Languages, and Computation by J. Hopcroft, R. Motwani, and J. Ullman, 3rdEdition, 2006, Addison-Wesley.
Reference Material	• An Introduction to Formal Language and Automata by Peter Linz, Jones & Bartlett Pub; 4thEdition (2006). ISBN-10: 0763737984 • Automata and Formal Languages: An Introduction by Dean Kelley, Prentice Hall (1995). ISBN-10: 0134977777
Course Goals	The course introduces students with fundamental concepts of automata theory and formal languages to form basic models of computation which provide foundation of many branches of computer science, e.g. compilers, software engineering, concurrent systems, etc.
Topics Covered in the Course,	• Introduction to Automata: The Methods and the

with Number of Lectures on Each Topic (assume 15-week instruction and one-hour lectures)	Madness, Introduction to Formal Proof, Inductive Proofs, The Central Concepts of Automata Theory. [TB: Ch.1] [Week: 1, Hours: 3] • Finite Automata: Introduction of Finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata, Finite Automata With Epsilon Transitions. [TB: Ch.2] [Week: 2-3, Hours: 6] • Regular Expressions and Languages, Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions. [TB: Ch.3] [Week: 4, Hours: 3] • Properties of Regular Languages, Proving Languages Not to Be Regular, Closure Properties of Regular Languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata. [TB: Ch.4] [Week: 5-6, Hours: 6] • Context-Free Grammars and Languages: Context-Free Grammars, Parse Trees, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages [Week: 7-8, Hours: 6] • Pushdown Automata: Definition of the Pushdown Automaton, The Languages of a PDA, Equivalence of PDAs and CFGs, Deterministic Pushdown Automata. [TB: Ch.6] [Week 9-10, Hours: 6] • Properties of Context-Free Languages: Normal Forms for Context-Free Grammars, The Pumping Lemma for Context-Free Languages, Closure Properties of Context-Free Languages, Decision Properties of CFLs. [TB: Ch.7] [Week: 11, Hours: 3] • Introduction to Turing Machines: Problems That Computers Cannot Solve, The Turing Machine, Programming Techniques for Turing Machines, Extensions to the Basic Turing Machine, Restricted Turing Machines, Turing Machines and Computers. [TB: Ch.8] [Week: 12-13, Hours: 6] • Un-decidability: A Language That Is Not Recursively Enumerable, Un-decidable Problem That Is RE, Un-decidable Problems About Turing Machines, Posts Correspondence Problem, Other Un-decidable Problems. [TB: Ch.9] [Week: 14-15, Hours: 6] • Intractable Problems: The Classes P and NP, An NP-Complete Problem, A Restricted Satisfiability Problem. [TB: Ch.10] [Week: 16, Hours: 3]

Laboratory Projects/Experiments Done in the Course	Not Applicable as per curriculum.			
Programming Assignments Done in the Course	Not Applicable as per curriculum.			
Class Time Spent on (in credit hours)	**Theory**	**Problem Analysis**	**Solution Design**	**Social and Ethical Issues**
	24 Hrs	12 Hrs	12 hrs	Not Applicable
Oral and Written Communications	Students are required to submit at least 3 written reports in the form of assignments. Presentations in the form of groups would be arranged in the last week if course would be covered before the 16th week.			

Instructor Name _____**Dr. Qaiser Abbas**_____

Instructor Signature _____

Date _____