INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM
INTRODUCTION OF NEW COURSE

Course Title	Class Field Theory	Course Code				
Dept./ Specialization	Dept. of SH (Mathematics)	Structure (LTPC)	3	1		4
To be offered for	Ph.D	Status	Core ☐		Elective ■	
Faculty Proposing the course	M. Subramani, Dept. of SH (Mathematics)	Type	New ■		Modification ☐	
Recommendation from the DAC		Date of DAC	17/07/2023			
External Expert(s)	1. Prof. K. Srinivas, Professor, IMSc, Chennai 2. Dr. Narasimha Kumar, Associate Professor, IIT, Hyderabad.					
Pre-requisite	Graduate Coursework in Algebra	Submitted for approval				
Learning Objectives	The course will introduce the student to the concepts in class field theory such as abelian extensions of the rationals: the Kronecker-Weber Theorem, group cohomology, local class field theory and additional concepts.					
Learning Outcomes	The approach to class field theory in this course is very global: Definitions the ideles and adeles, then uses L-functions and cohomology.					
Contents of the course (With approximate break-up of hours for L/T/P)	Review of local fields, and Ostrowski's theorem for number fields, global fields, ring of adeles, ideles. The abelian extensions of the rationals: [10L+3T] The Kronecker-Weber theorem, Kummer theory; Cohomology of groups: cohomology of finite group, homology of finite groups. [10L+4T] Statements of class field theory: The Hilbert class field, the principal ideal theorem, zeta functions and the Chebotarev's density theorem. [10L+4T] Local class field theory: local class field theory via Tate's theorem, global class field theory. [12L+3T]					
Text Book	1. Serge Lang, *Algebraic Number Theory, 2nd Edition* Springer-Verlag (1994). 2. *Algebraic Number Theory, Jurgen Neukirch,* 1st edition, Springer-Brelin, Heidelberg (2010).					
Reference Books	1. Cassels and Frohlich, *Algebraic Number Theory*, 2nd edition, London Mathematical Society (2010). 2. Serre, *Local Fields,* 1st edition, Springer New York, NY (1980). 3. Washington, *Introduction to Cyclotomic Fields*, 2nd edition, Springer New York, NY (2012). 4. Kiran S. Kedlaya , Notes on class field theory (online lecture notes), Department of Mathematics, University of California, San Diego (2017).					