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

Course Title	**Introduction to biometrics**	Course Code	CS5XXX			
Dept./ Specialization	Computer Science and Engineering	Structure (LTPC)	3	1	0	4
To be offered for	**UG/PG**	Status	Core ☐		Elective ▬	
Faculty Proposing the course	Rahul Raman, CSE	Type	New ▬		Modification ▬	
Recommendation from the DAC		Date of DAC	**10th December 2021**			
External Expert(s)	**Dr. Surya Prakash, Associate Prof. (IIT Indore), Dr. Pankaj K Sa, Associate Prof. (NIT Rkl)**					
Pre-requisite	CoT	Submitted for approval				
Learning Objectives	• To understand the basics of biometrics and its functionalities • To learn the role of biometric in the organization • To learn to develop applications with biometric security					
Learning Outcomes	• Summarize biometrics overview and applications • Choose suitable security techniques for biometric • Identify the multidisciplinary technologies for biometric applications					
Contents of the course *(With approximate break-up of hours for L/T/P)*	**Introduction**: Introduction of biometric traits and its aim, Biometric functionalities: verification and identification, Biometric system, Authentication, Biometric systems errors, Applications of Biometric systems, Security and privacy issues, attacks on biometric systems, Application areas (4L, 1T) **Acquisition and Pre-processing Basics**: Image acquisition, working with different image types, Feature types and descriptors, Geometric transformations, masking, filters (4L, 1T) **Biometric System Evaluation:** Identification and verification, Threshold, Score distribution, FAR and FRR, System design issues, Positive/negative identification, Authentication methods, statistical test of significance, Trade-offs b/w security and convenience. (5L, 2T) **Physiological Biometrics:** Overview, Properties of physiological biometrics, Fingerprint: friction ridge pattern, Face recognition, IRIS recognition, Other traits, Challenges, Soft biometrics, Open Issues. (5L, 2T) **Behavioural Biometrics:** Overview, Properties of behavioural biometrics, Gait, Signature, Keystroke based recognition, Error sources, Open issues. (5L, 1T) **Multimodal Biometrics:** Suitable biometric, Biometric attributes, Zephyr charts, Multi biometrics. Fusion methods, Multimodal identification. (2L, 1T) **Biometric System Vulnerabilities:** Circumvention, Covert acquisition, Quality control, Template generation, Interoperability, Data storage challenges. (2L, 1T) **Biometric Applications:** Application areas, User system interaction, Application development, Design validation, Disaster recovery plan, Maintenance, Application concerns: effect of genetics, weather, aging etc, Privacy concerns. (4L, 2T)					
Text Book	1. A.A. Ross, P. Flynn, and A.K. Jain, Handbook of Biometrics, Springer , ISBN: 9780387710402 2. J.L. Wayman, A. Jain, D. Maltoni, and D. Maio, Biometric Systems Technology, Design and Performance Evaluation, Springer , ISBN: 9781852335960					
Reference Books	1. Guide to Biometrics, R. M. Bolle, S. Pankanti, N.K. Ratha, A. W. Senior, J. H. Connell, Springer 2009 ISBN 978-0387400891, 2. A.A. Ross, K. Nandakumar, and A.K. Jain, Handbook of Multibiometrics, Springer , ISBN: 9780387222967					