SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Electronics and Communication Engineering	LP: EC22054 Rev. No: 00 Date: 20/1/2025
B.E/~~B.Tech/M.E/M.Tech~~ : **ECE** Regulation:**2022** PG Specialisation : **NA** Sub. Code / Sub. Name : **EC22054 BIOMETRIC SYSTEMS** **Unit** : **I -** INTRODUCTION TO BIOMETRICS	

Unit Syllabus: Introduction and background – biometric technologies – passive biometrics – active biometrics - Biometric systems – Enrolment – templates – algorithm – verification – Biometric applications – biometric characteristics- Authentication technologies –Need for strong authentication – Protecting privacy and biometrics and policy – Biometric applications – biometric characteristics.

Objective: To introduce the basics of biometrics and its functionalities.

Session No	**Topics to be covered**	**Ref**	**Teaching Aids**
1	Introduction and background – biometric technologies	1,2,3	PPT
2	passive biometrics – active biometrics	1,2,3	PPT
3	Biometric systems, Enrolment, templates, algorithm, verification	1,2,3	PPT
4	Biometric applications	1,2	PPT
5	biometric characteristics	1,2,3	PPT
6	Authentication technologies	1,23	PPT
7	Need for strong authentication	1,2,4	PPT
8	Protecting privacy and biometrics and policy	1,2,4	PPT
9	Biometric applications, biometric characteristics.	1,2	PPT
Content beyond syllabus covered (if any): Nil			

* Session duration: 50 minutes

Sub. Code / Sub. Name: **EC22054 BIOMETRIC SYSTEMS**

Unit : II - FINGERPRINT RECOGNITION

Unit Syllabus: History of fingerprint pattern recognition - General description of fingerprints - Fingerprint feature processing techniques - fingerprint sensors using RF imaging techniques – fingerprint quality assessment – computer enhancement and modeling of fingerprint images – fingerprint enhancement – Feature extraction – fingerprint classification – fingerprint matching

Objective: To understand the technologies of fingerprint recognition.

Session No *	Topics to be covered	Ref	Teaching Aids
10	History of fingerprint pattern recognition	1,2	PPT
11	General description of fingerprints	1,3	PPT
12	Fingerprint feature processing techniques	1,2	PPT/ICT
13	Fingerprint sensors using RF imaging techniques	1,2,3	PPT/ICT
	FAT 1		-
14	Fingerprint quality assessment	3	PPT
15	Fingerprint enhancement	3.4	PPT
16	Feature extraction	1,2	PPT
17	Fingerprint classification	1,2,4	PPT/ICT
18	Fingerprint matching	5,6	PPT
Content beyond syllabus covered (if any): Nil			

* Session duration: 50 mins

Sub. Code / Sub. Name: : **EC22054 BIOMETRIC SYSTEMS**

Unit : III - FACE RECOGNITION AND HAND GEOMETRY

Unit Syllabus : Introduction to face recognition, Neural networks for face recognition – face recognition from correspondence maps – Hand geometry – scanning – Feature Extraction – Adaptive Classifiers - Visual-Based Feature Extraction and Pattern Classification - feature extraction – types of algorithm – Biometric fusion.

Objective: To identify the issues in realistic evaluation of Face and hand recognition biometrics systems.

Session No *	Topics to be covered	Ref	Teaching Aids
19	Introduction to face recognition	1,2,6	PPT
20	Neural networks for face recognition	1,2,6	PPT
21	face recognition from correspondence maps	1,2,5	PPT
22	Hand geometry, Scanning, Feature Extraction	1,2	PPT/ICT
23	Adaptive Classifiers	1,2,6	PPT
24	Visual-Based Feature Extraction	1,2,6	PPT
25	Pattern Classification	1,2	PPT
26	Feature extraction, types of algorithm	1,2	PPT
27	Biometric fusion.	1,2	PPT
	FAT-2	-	-

Content beyond syllabus covered (if any): Nil

* Session duration: 50 mins

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Unit : IV - MULTIMODAL BIOMETRICS AND PERFORMANCE EVALUATION

Unit Syllabus: Voice Scan – physiological biometrics –Behavioral Biometrics - Introduction to multimodal biometric system – Integration strategies – Architecture – level of fusion – combination strategy – training and adaptability – examples of multimodal biometric systems – Performance evaluation, Statistical Measures of Biometrics – FAR – FRR – FTE – EER – Memory requirement and allocation.

Objective: To acquire knowledge in building a multimodal biometric system and its performance evaluation**.**

Session No *	Topics to be covered	Ref	Teaching Aids
28	Voice Scan	1,2,6	PPT
29	Physiological biometrics, Behavioral Biometrics	1,2,6	PPT
30	Introduction to multimodal biometric system	1,2,6	PPT
31	Integration strategies, Architecture	1,2	PPT
32	Level of fusion, combination strategy	1	PPT
33	Training and adaptability	1,2,6	PPT
34	Examples of multimodal biometric systems	1,2	PPT/ICT
35	Performance evaluation	1,4,5	PPT
36	Statistical Measures of Biometrics – FAR – FRR – FTE – EER – Memory requirement and allocation.	1,4,5	PPT
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

Sub. Code / Sub. Name: EC22054 BIOMETRIC SYSTEMS

Unit : V - BIOMETRIC AUTHENTICATION

Unit Syllabus: Introduction - Biometric Authentication Methods - Biometric Authentication Systems – Biometric authentication by fingerprint -Biometric Authentication by Face Recognition. Expectation Maximization theory - Support Vector Machines. – Biometric authentication by hand geometry Multibiometric authentication.

Objective: To express knowledge in various computation of authentication methods

Session No *	Topics to be covered	Ref	Teaching Aids
37	Introduction to Biometric Authentication Methods	1,2,6	PPT
38	Biometric Authentication Systems	1,2,6	PPT
39	Biometric authentication by fingerprint	1,2,5	PPT
40	Biometric Authentication by Face Recognition	2,6	PPT
41	Expectation Maximization theory	1,2,6	PPT
42	Support Vector Machines	1,2	PPT
43	Biometric authentication by hand geometry	1,2	PPT
44	Biometric authentication by hand geometry	1,2	PPT
45	Multibiometric authentication	1,2	PPT
46	Introduction to Vascular Biometrics	4	PPT
	FAT-3	-	-

Content beyond syllabus covered (if any): Introduction to Vascular Biometrics

* Session duration: 50 mins

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REFERENCES:

1. Anil K. Jain, Arun Ross, and Karthik Nandakumar, "Introduction to Biometrics", Springer, 2011.
2. Anil K Jain, Patrick Flynn and Arun A Ross, "Handbook of Biometrics", Springer, 2007. ISBN: 978-0-387-71040-2.
3. Nikolaos V Boulgouris, Konstatinos N Plataniotis and Evangelia Micheli Tzanakov, "Biometrics Theory, Methods and Applications", IEEE & Wiley, 2009, ISBN: 978-0470- 24782-2
4. John D Woodward, Nicholas M Orlans and Peter T Higgin, "Biometrics: The Ultimate Reference", Dream Tech, 2009.
5. Guide to Biometrics, By: Ruud M. Bolle, Sharath Pankanti, Nalini K. Ratha, Andrew W. Senior, Jonathan H. Connell, Springer 2009.
6. https://archive.nptel.ac.in/content/syllabus_pdf/106104119.pdf

	Prepared by	Approved by
Signature		
Name	Dr.R.Gayathri	Dr.G.A.Sathish Kumar
Designation	Professor	Professor and HoD, ECE
Date	20/01/2025	20/01/2025

Remarks *:

Remarks *:

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD