SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
Ramapuram Campus

FACULTY OF ENGINEERING AND TECHNOLOGY

Department of Mathematics

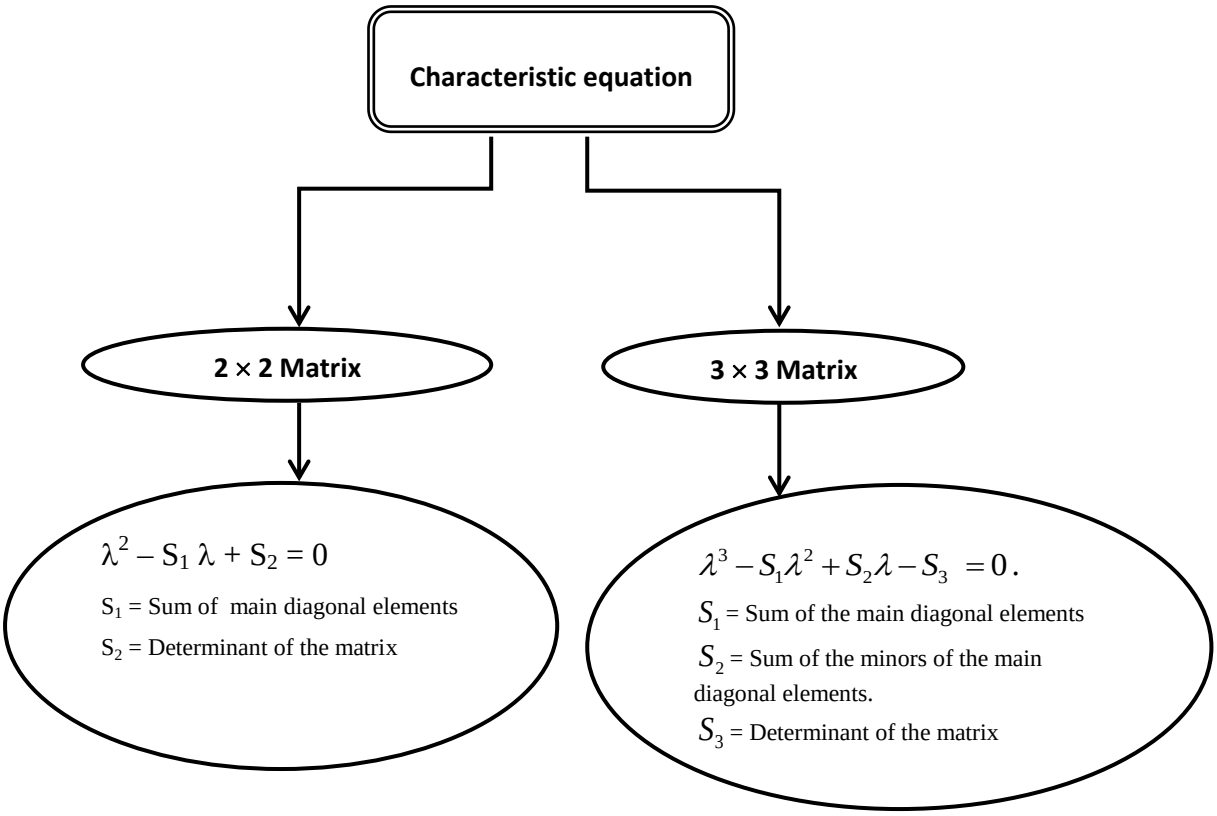
Odd Semester 2022 – 2023

Innovative Teaching Methods

21MAB101T – Calculus and Linear Algebra

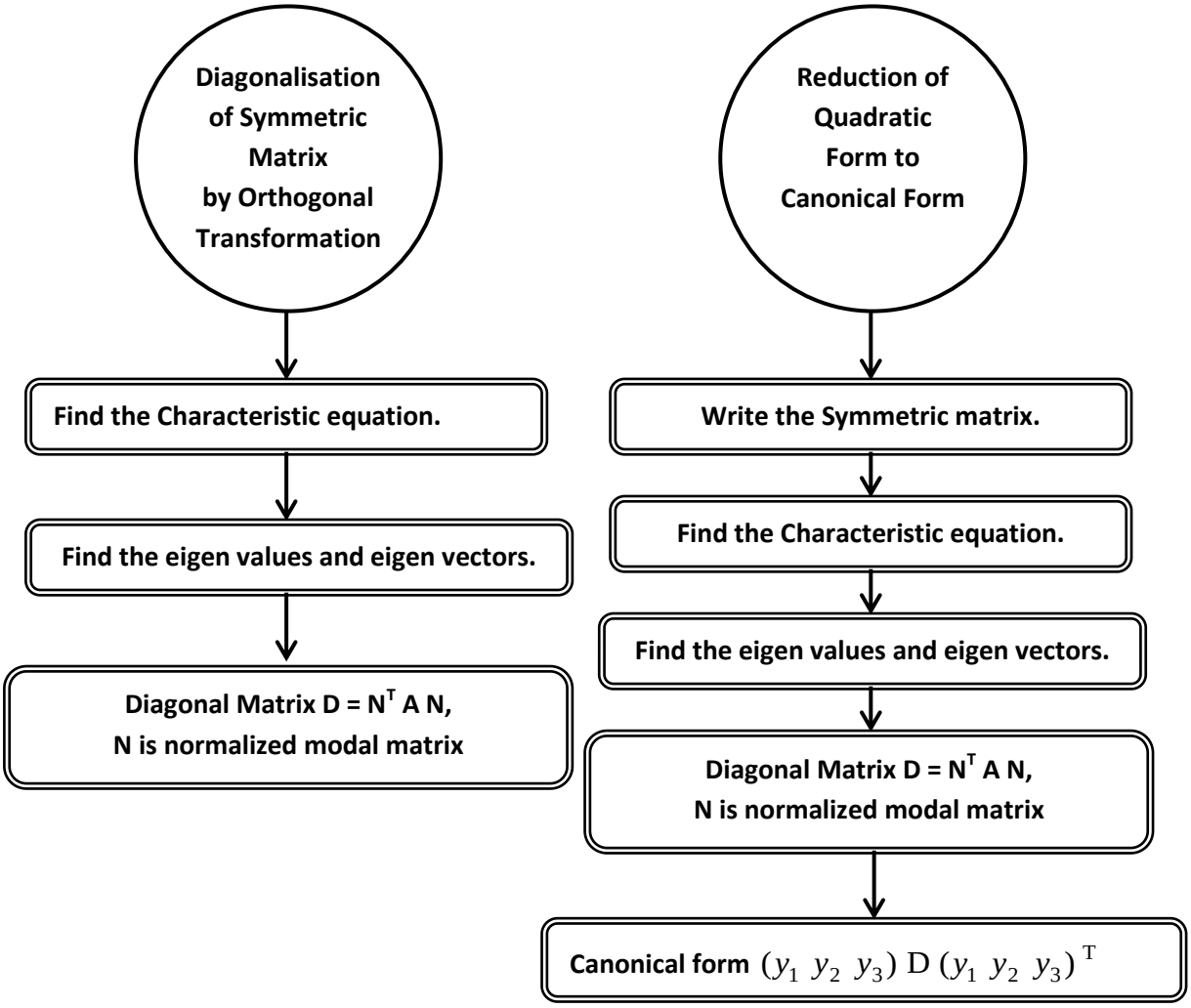
Pedagogy 2 – Concept Mapping

A **concept map** is a graphical representation of interconnected concepts to explain an idea or a field of knowledge.



Cayley Hamilton Theorem

Every square matrix satisfies its own characteristic equation.



NATURE OF THE QUADRATIC FORM

Nature	If the eigen values are known	If the eigen values are unknown
Positive definite	All the eigen values are positive	D_1, D_2, D_3 are positive
Negative definite	All the eigen values are negative	D_1, D_3 are negative D_2 is positive
Positive semi definite	All the eigen values are positive and atleast one is zero	$D_1 \geq 0$, $D_2 \geq 0$, $D_3 \geq 0$ and atleast one is zero
Negative semi definite	All the eigen values are negative and atleast one is zero	$D_1 \leq 0$, $D_2 \leq 0$, $D_3 \leq 0$ and atleast one is zero
Indefinite	eigen values are positive and negative	All the other cases

Where, $D_1 = |a_{11}|$, $D_2 = \begin{vmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{vmatrix}$, $D_3 = \begin{vmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{vmatrix}$

Rank r = No. of non-zero terms in Canonical form
Index p = No. of positive terms in Canonical form
Signature $s = 2p - r$

Staff incharge **HOD / Mathematics**