Department of Electrical Engineering

Curriculum for MTech (2yr) in Communications, Signal Processing and Learning (CSPL)

(July 2024 onwards)

Semester - I		
Course Number	**Course Name**	**Credits**
EE5817	Random Variables and Stochastic Processes	3
EE5609	Matrix Theory	3
EExxxx	Lab (see basket below)	2
EExxxx	Dept elective (basket below)	3
SS5901	Industry Lectures	1
LA5180	English Comm	1
	Total Credits	**13**
Semester - II		
Course Number	**Course Name**	**Credits**
EExxxx	Dept elective (basket below)	15
	Total Credits	15

Option - A (Thesis) Semester - III		
Course Number	**Course Name**	**Credits**
EE6715	MTech CSPL Thesis stage - 1	12
	Total Credits	12
Semester - IV		
EE6725	MTech CSPL Thesis stage - 2	12
	Total Credits	12

Option B (Project) Semester - III		
EExxxx	Dept electives (see baskets below)	6
EE6735	Project 1	6
	Total Credits	12
Semester - IV		
EExxxx	Dept electives (see baskets below)	6
EE6745	Project 2	6
	Total Credits	12

Students can switch to option B before the add/drop deadline of semester III. Once this option is exercised, the student cannot revert to Option A. The 2-Year MTech students who joined in July 2023 may also exercise this option before the add/drop deadline of their semester III.

Credit Summary

Course type	**Credits**
Department core	6
Core (lab)	2
Soft skills	2
Option - A	
Electives (theory + lab)	18
Thesis	24
Option - B	
Electives (theory + lab)	30
Project	12
Total	**52**

Lab basket (minimum 2 credits)

Students can pick any 2 credits of these lab courses, depending on their thesis topic or interest.			
Course code	Course name	Credits	Prerequisites
EE5801	Communications lab	1	Digital communication
EE5803	FPGA lab	1	None
EE5802	DSP lab	1	None
EE5911	Next-gen wireless lab	1	Wireless Communication
EE5901	Machine learning lab	1	PRML or equivalent

Elective Baskets

From all the baskets given below, students must take a total of 18 credits for option A, or 30 credits for option B.

Theory and Foundations Basket (no minimum credit requirement)		
Course code	Course name	Credits
EE5606	Convex Optimization	3
EE5903	Information theory, coding and inference	3
EE5603	Concentration Inequalities	1
EE5913	Statistical Inference	3
EE5910	Advanced Stochastic Processes	3

Signal Processing and Learning basket (minimum 6 credits from this basket)		
Course code	Course name	Credits
EE5900	Advanced Digital Signal Processing	3
EE6307	Speech Systems	3
EE5630	Topics in Signal Processing	2
EE5360	Practical Challenges in Image Analysis	3
EE6310	Image and Video Processing	3
EE7350	Adaptive Signal Processing	3
EE5802	DSP lab	1
EE5811	FPGA Lab	1
EE5610	Pattern Recognition and Machine Learning	3
EE6380	Deep Learning	3
EE5600	Introduction to Machine Learning	1
EE5601	Representation Learning	1
EE5602	Probabilistic Graphical Models	1
EE5604	Introduction to Statistical Learning Theory	1
EE5605	Kernel Methods	1

EE5611	Machine Learning Applications for Wireless Communications	3
EE5620	Machine Learning for Signal Processing	3
EE5720	Game theory	1
EE5328	Intro to submodular functions	1
EE5901	Machine Learning Lab	1

Communications Basket (minimum 3 credits from this basket)		
Course code	Course name	Credits
EE5837	Principles of Digital Communication	3
EE6340	Wireless Communications	3
EE6320	Wireless Sensor Network	3
EE5350	Error Correcting Codes	3
EE7330	Network Information Theory	3
EE5161	Introduction to UAV	2
EE6330	Advanced Cellular Communications	3
EE6350	Multiple Antenna Systems	3
EE6341	Communication Networks	3
EE5848	Topics in Information Theory & Coding	2
EE6367	Topics in data storage and communications	2
EE5640	Automotive Communication and Sensing	3
EE5801	Communications lab	1
EE5911	Next-gen wireless lab	1
SM5010	Autonomous Navigation	2
SM5030	Internet of Things (IoT)	2

Students can take any other EE5 or higher level courses not in the baskets with the prior approval of the faculty advisor.